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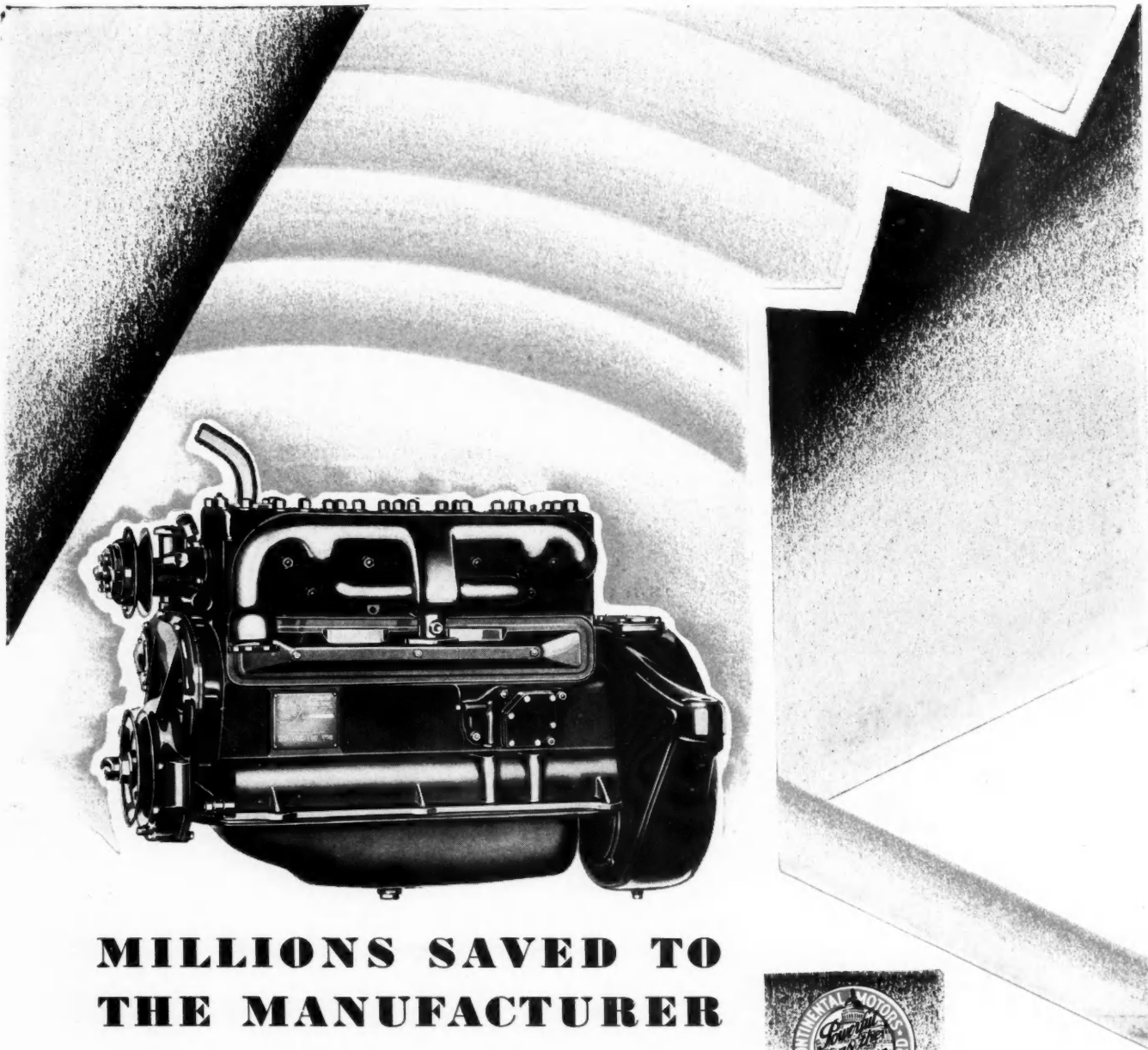
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Vol. 61

No. 10

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Contents

Fall Sales Increase Forecast to Follow August Pick-Up. By Earl O. Ewan	325
Principle of Device for Controlling Pitch of Propellers Accepted by S.A.E. in Advance of Commercial Production	326
Airplane Engine Performance Gaged on Scale of Operation Costs	329
Wing Design Has Definite Limits When Analyzed by Mathematics	331
Application of Light Alloys for Aircraft Use Described	334
Aeronautical Exhibition at Cleveland Included Units of Most Companies	336
Canadian Motor Show Included Forty American Car Exhibits. By Warren Hastings	339
Stainless Steel's Advantage Lies in Non-Corrosive Properties. By Athel F. Denham	341
Cooling of Generator Depends Upon Location on Engine	343
Tractor Manufacture Speeded by Multiple-Operation Units	347
Diamond T Offers Eight-Ton Truck With Timken Rear Axle Bogey. By M. Warren Baker	349
Lo-Swing Full Automatic Lathe Developed for Piston Turning	351
News of the Industry	352
Men of the Industry	354
Financial Notes	356
Calendar of Events	360
Advertisers' Index	124, 125

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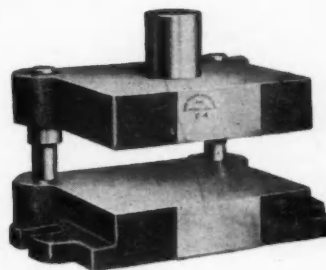
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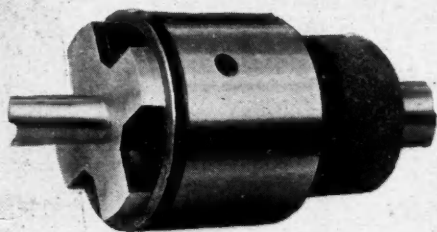


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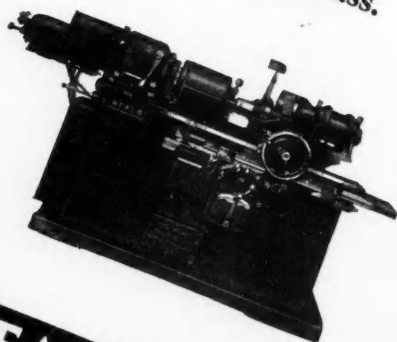
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AUTOMOTIVE INDUSTRIES

VOLUME 61

Philadelphia, Saturday, September 7, 1929

NUMBER 10

Fall Sales Increase Forecast To Follow August Pick-Up

Stimulated business of autumn expected to be shared by automobile industry to a larger extent than ever before. Lower priced cars provided the volume last month.

By EARL O. EWAN

THIS week has marked the opening of the fall business season and the closing, to a great extent at least, of the summer vacation period. While the gain in trade momentum has been small since the crossing of the dividing line of Labor Day, due to the short week and the many personal and other adjustments that are necessary after days of respite, it has been noticeable. Judging from present indications, the automotive industry will enjoy a larger share than ever before of the stimulated business that accompanies the arrival of fall. This prediction is even more impressive coming, as it does, in the wake of months of record sales volumes in the motor vehicle field.

The forecast is not based alone upon general comment and statistics, but also upon reports of automotive business and its prospects from 15 of the outstanding centers of the United States compiled especially for *Automotive Industries*. These reports, which are published at the conclusion of this article, show that in most places August sales outnumbered those of the same month in 1928. New car stocks apparently are not a subject of grave concern, except in rather isolated instances, while used car stocks have been increasing in a number of areas.

In New Orleans and vicinity, the automotive turnover rate apparently has reached a peak for the country, when one makes due allowances for comparison. This has been attributed largely to the street car strike there. Favorable reports have been received also from Cleve-

land, Dallas, Tex.; Oakland, Cal.; Minneapolis, Kansas City, Detroit and St. Louis. Denver, Atlanta, Chicago, New York and Seattle are among the districts where dealers are reported to have heavy stocks of new and used cars, particularly the latter, with markets that range from somewhat dull to rather sluggish.

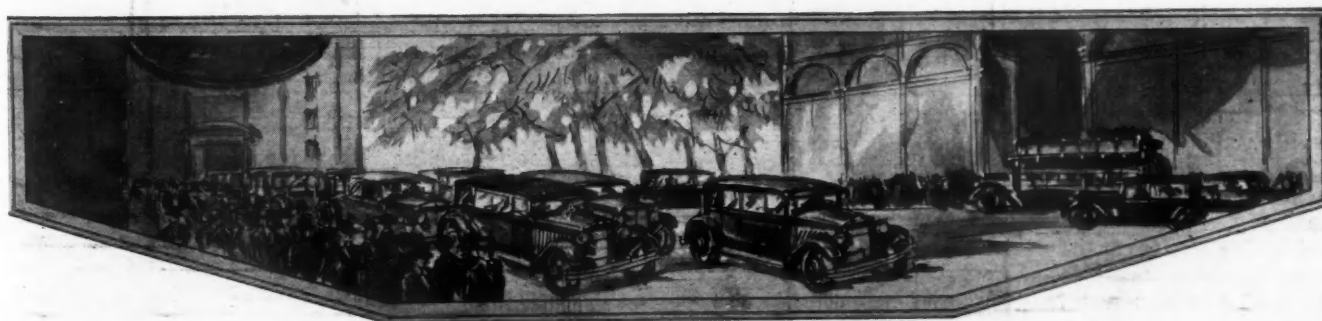
Lower priced automobiles furnished the sales volume in most localities to the extent of from around 60 to more than 70 per cent in August. Ford and Chevrolet have been leading in sales almost universally. The showing made by Whippet has evoked comment in a few instances, and the sales pick-up registered by Buick since the introduction of its new models indicates that they are proving attractive.

In discussing the situation in its bulletin of Aug. 25, the National Automobile Dealers Association states that on the basis of reports received at its headquarters in Chicago, "The logical deduction seems to be that inventories are decidedly abnormal" and profits "in the same proportion subnormal."

Under the heading "Farm Situation Important to Dealers," the association bulletin states:

"The chart on the year's wheat crop shows 834,000,000 bushels for the year as compared with 902,000,000 in 1928, 878,000,000 in 1927 and 810,000,000 for the five years' average. The most recent reports carry this reduction to even lower levels. Moreover, world crops, taken in connection with the carry-over, indicate less

(Continued on page 358)



Principle of Device for Controlling By S. A. E. in Advance of

*Design of unit, with special ref
discussed rather than the
at the Aeronautical*



T. P. Wright, chief engineer, Airplane Division, Curtiss Aeroplane & Motor Co., who presented two of the three papers at the propeller session, one on a controllable pitch propeller and one on gearing

RARELY does it occur that a device which has not yet reached the stage of commercial application is accepted in principle in advance. Yet that was exactly the situation in respect to propellers having their pitch controllable in flight at the Propeller Session of the Aeronautic meeting of the S.A.E. held in Cleveland last week. The discussion following a paper by T. P. Wright and W. R. Turnbull, both of Curtiss Aeroplane & Motor Co., on the subject of Controllable Pitch Propellers, centered itself not on the desirability of the device, but on its design, with special reference to (1) the type of control used and (2) propeller design as affected by a controllable pitch arrangement.

The latter was the subject of a paper entitled "Variable Pitch Propellers," presented by Frank W. Caldwell, Standard Steel Propeller Co. In addition it seemed to be the consensus of the meeting that gearing of propellers has not been given the attention which it merits. Opinions expressed on the paper on "Gearing of Aircraft Propellers," by T. P. Wright and R. E. Johnson, of Curtiss Aeroplane & Motor Co., indicated that a wider use and application of gearing was desirable.

Discussion of the Wright and Turnbull paper was led off by Lieutenant Commander C. B. Harper, Navy Department, Bureau of Aeronautics, who said that the Navy certainly needs controllable pitch propellers for its big flying boats. Major Leslie MacDill, Material Division, Wright Field, added to this that the Army needed them in connection with supercharged engines for high altitude work.

Amplifying Lieutenant Commander Harper's statement, his confrere Lieutenant Commander C. H. Havill, the Navy propeller expert, said that he did not think that a 360-deg. reversible propeller was essential, and that perhaps a 3 to

5-deg. automatic pitch control in the advance position was sufficient for most operations, although the 360-deg. type, or a propeller adjustable from a negative pitch of 12 deg. to a positive pitch of around 40 deg., was desirable for the big boats, to enable the use of the propeller as a brake in landing, etc.

Lieutenant Commander Havill based his first suggestion on practical experience. The Navy has an automatic control propeller with a 3-deg. automatic advance. The blades in this propeller are attached to the hub in two directions and at different tensions by several hundred piano wires. In the normal position the propeller has a pitch of 18 deg. When the engine reaches a rotational speed of 900 r.p.m., the pitch drops to 15 deg. and remains there up to an air speed of 100 m.p.h., approximately, when it automatically returns to 18 deg. This permits use of a low pitch and greater engine revolutions per minute for taking off large boats. A cam device prevents dropping the pitch back to 15 deg. when the engine is throttled down for cruising, down to a certain predetermined engine speed. The device depends for its automatic action on torque reaction and centrifugal force set up in the propeller, of course.

E. P. Warner, editor of *Aviation*, stated that the big advantage of controllable pitch propellers to him was the marked increased in economy which can be obtained at cruising speed with propellers of larger pitch than those which would have to be used for maximum efficiency at top speed operation. Although he said a governor control might be worked out, he also said that he did not feel that either a manual pitch adjustment or an automatic control was the answer. From a commercial point of view the pilot should have to do nothing more than to set an indicator on a dial for the desired pitch at any time, and have the propeller assume this pitch through some interconnected mechanical means.

Frank W. Caldwell and Lieutenant Commander Havill both agreed that governor or full automatic control through a large pitch range was undesirable, the first on the basis that propeller efficiency drops (V/ND decreases) with pitch increase as the throttle is closed, and the second on the basis of objections from bearing manufacturers that full automatic control in cutting down the engine speed also increases the bearing loads. In tests, 90 per cent top speed has been obtained with only 1000 r.p.m., but with naturally high bearing loads. This was the reason, he stated, for his suggesting limit-



Pitch of Propellers Accepted Commercial Production

*ference to type of control, was
desirability of the device,
Meeting of the S. A. E.*

ing the automatic advance to 3 to 5 deg., in spite of the fact that higher cruising speeds for the same consumption can be obtained with larger pitches.

Larger diameter propellers also will be a natural outcome of the adoption of controllable pitch, Mr. Caldwell also pointed out.

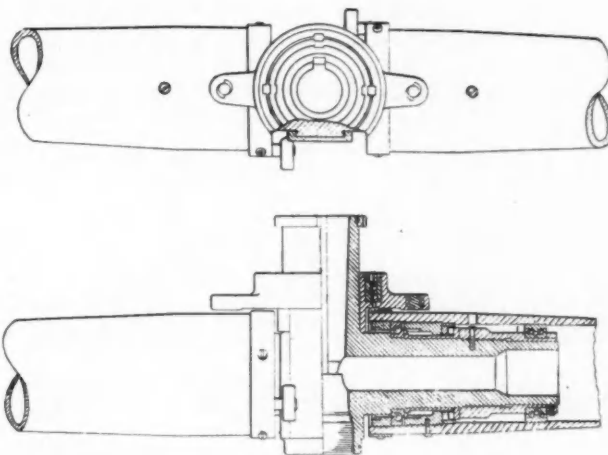
Following are abstracts of Messrs. Wright and Turnbull's, and Mr. Caldwell's papers, which furnished the basis for the discussion:

In this paper, T. P. Wright and W. R. Turnbull review the various advantages of controllable pitch propellers, especially as regards changing the pitch for take-off, climb and high altitude flying, for increased power, higher top speed and lower fuel consumption. Additional test data is cited, showing the effect of varying the pitch on various factors of operation.

A brief history of the development of controllable pitch propellers is given, and the latest development of the Turnbull propeller is described. It has a duralumin blade extending into a steel hub, with a ball thrust washer for centrifugal loads. Pitch change is by electric motor through reduction gearings of 48,000 or 64,000 to 1, giving a 1 deg. change for about 2-3 sec. Weight at present is 107 lb. for all rotating parts, and it is expected that this can be reduced to a point not more than 20 to 30 per cent greater than fixed pitch types of propellers.

"Variable Pitch Propellers," was the subject of a paper by Frank W. Caldwell, Standard Steel Propeller Co., in which he stated that up to the present complication of existing devices has been considered too great to warrant putting controllable pitch propellers on the market. An important feature in connection with their design is the tendency of present sections to burble at comparatively low angles when running at high speed. In wind-tunnel tests it was found that either lowering the angle of attack or decreasing the camber ratio resulted in raising the speed at which the burble occurred. Other tests indicated that changing the angles of attack of all portions of the blade equally with pitch changes will have no serious effect over the range of angles likely to be used in practice.

Three most important factors for control adjustment design are frictional forces and twisting moments produced by both centrifugal force and air pressure. The first can be taken care of by proper anti-friction bearing design. For the second the author has worked



In the reversible steel propellers shown in this design, by T. P. Wright and W. R. Turnbull, the blades are easily attached to the metal hub

out a mathematical and graphical method of computing the stresses at any point. The third can be offset after proper study by addition of counterweights. Several experimental designs of controllable pitch propellers are discussed and illustrated, and the opinion is expressed that improved materials and designs will soon meet the practical requirements.

In the discussion of Messrs. Wright and Johnson's paper of propeller gearing, Major MacDill said it was extremely unfortunate that gearing always has followed about a year behind the introduction of a direct drive engine, by which time new models were again coming through. But the major part of the discussion centered itself about the application of gearing to engines in smaller ships than are at present generally considered suitable for this.

Messrs. Wright and Turnbull had stated in their paper that experience did not warrant application of gearing to engines smaller than 400 hp. or ships weighing less than 4000 lb., basing their statement of the maximum tip speed effect, which for these ships, they said, was below the upper burble point limit. Harold Caminez, who recently joined the staff of Allison Engineering Co., was the first to disagree with this, stating that all geared engines in the past have been large ones, and chiefly designed for service ships. Power loss through reduction gearing, Mr. Caminez also said, was in his experience nearer to 1 per cent than to the 2 to 4 per cent figure given in the paper.

Mr. Caldwell agreed with the authors that small ships do not require reduction gearing, since they run no faster than do the large engines and the tip speed is low enough, but Mr. Caminez replied that the question of which is cheaper, a larger engine with no gearing or a high speed engine with reduction gearing, had not yet been settled. Mr. Warner agreed with this, saying that if he were to



build small planes he wouldn't want to be limited to direct drive propellers, since efficiency is an important factor in this class. That a greater advantage in large than small engines would be found, however, was the opinion of Robert Insley, Continental Motors Corp.

Following is an abstract of the Wright and Johnson paper:

In considering reduction-gear installation, several points are emphasized. At best such an installation is a compromise between the gains and losses involved, and the amount of net gain depends largely upon the particular engine and airplane combination and upon its design performance. Experience shows that the net gain does not warrant the gearing of engines rated at less than 400 hp., or for airplanes weighing less than 4000 lb. The type of airplane may limit the application of gearing because it might require excessive additions to the landing-gear to secure proper ground-clearance. Airplanes hav-

ing design values of $v/ND = 0.7$ or greater and at the same time having a propeller tip-speed less than the limit given 1000 ft. per sec. for metal and 850 ft. per sec. for wooden propellers, would not give an increase of performance of sufficient magnitude to warrant the added complications. However, when the designed performance of a airplane does not come within the range of values stated, a designer should be hesitant about installing a direct-drive propeller.

Reduction-gearing is a refinement of design and, very often, a similar gain of performance can be obtained by using more care in attaining cleanness of the general-design characteristics of a given airplane. In the past, gearing has resulted in correcting poor basic design instead of giving super-performance to an originally so-called clean design. The trend in large multi-engine transport-airplanes will be decidedly favorable to the use of gearing.

Varied Subjects Discussed at S. A. E. Banquet

THE autogiro, how operating costs increase with cruising speeds, and decrease with higher landing speeds, the problem of selling aviation and airplanes to business houses, a request for continuing co-operation of commercial manufacturers in military developments, the psychological aspect of airplane design development, and the first presentation of the Manly Memorial Medal were all features of the Aeronautic Dinner and Technical Session, presided over by W. E. England, F. B. Stearns Co., and Capt. E. S. Land, of the Guggenheim Fund, respectively.

The first was discussed by its inventor, Senor Juan de la Cierva, who stated that the objection to the "higher drag" of the autogiro was unfair, and that the total drag was actually lower. Senor de la Cierva predicted even higher speeds with the autogiro than were obtainable with standard airplane designs.

The second subject formed the topic of a paper entitled "The Economic Relationship of Speed and Weight in Air Transportation," by E. P. Warner, Editor of *Aviation*, and President of the Society. Mr. Warner mathematically demonstrated that increases in cruising speed without increases in landing speeds enormously increased the operating costs. Mr. Warner drew the conclusion from his analysis of a theoretical airplane that in no case does seeking to operate at cruising speeds more than 1.8 times the minimum flight speed appear economically advisable at present. To increase cruising speeds, therefore, landing speeds have to be increased and greater safeguards against forced landings in small fields provided.

"The Selling of Airplanes to Business Houses" was the subject of a paper by Russell L. Putnam, Chicago publisher. Mr. Putnam cited three outstanding characteristics of the business house's attitude toward flying, from his contact with thousands of business men as a result of his own operation of airplanes, for busi-

ness purposes. These characteristics are: (1) fear, (2) high cost, and (3) lack of understanding of the airplane's use. He believes that the first is largely also a question of lack of understanding, and that since only the unusual hazardous or spectacular are considered as news, airplane manufacturers will have to convey safety to business men through the medium of paid space.

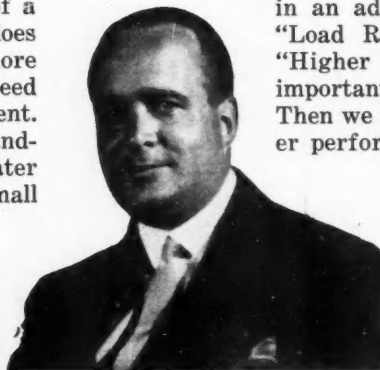
According to investigation, Mr. Putnam also says that aviation enterprises have been trying to operate on a 10 to 20 per cent selling cost as against 20-40 per cent cost for non-aviation enterprises. By spending more money in overcoming sales resistance by conveying a clearer understanding of the airplane's possibilities to business men and houses, the field should be capable of considerable expansion.

The request for continued interest in military development was incorporated in a brief address by the Hon. David S. Ingalls, Asst. Sec. of the Navy for Aeronautics. Mr. Ingalls also traced the development of aviation showing the tremendous effect of its development of the appointment and acts of the Coolidge-Morrow board.

"Past performance figures are no criterion on which to base future heavier than air development," stated William B. Stout, President Stout Air Lines, Inc., in an address he gave in place of his paper on "Load Rating." Continuing, he said, in part: "Higher cost as a factor in sales is not always important. We build a plane for certain engines. Then we increase the size of the engines for greater performance, and add several thousand dollars to the cost, and nobody wants the ship with the smaller engines."

Airplane development, Mr. Stout stated, was not an engineering or a sales problem, but one of psychology, with the safety factor paramount.

S. D. Heron, Wright Field, was the recipient of the Manly Memorial Medal, presented to him by Charles L. Lawrance, chairman of the award committee, for his paper on the future development of aircraft engines.



Senor Juan de la Cierva,
guest of honor at the S.A.E.
Aeronautic dinner meeting,
discussed his autogiro

Airplane Engine Performance Gaged On Scale of Operation Costs

Effect of increased weight, lower fuel consumption, mean effective pressure, etc., are converted into dollars and cents in paper presented at S.A.E. Meeting

HIGH temperature liquid cooling, and the economics of engine design as related to performance occupied the attention of the powerplant session, at the Aeronautic meeting of the S.A.E. held in Cleveland last week. The session was presided over by Captain L. M. Woolson, aeronautical engineer, Packard Motor Car Co. The first mentioned subject was introduced in a paper of that title by Gerhardt W. Frank, material division, Wright Field, and the second by J. H. Geisse, vice-president in charge of engineering, Comet Engine Corp., in his paper "Gaging Engine Performance." He also presented a written discussion of Mr. Frank's paper.

Mr. Geisse in his paper attempted to convert into operating costs in dollars and cents, the effect of variations in engine characteristics, such as increased weight, lower fuel consumption, a combination of these two, mean effective pressure, etc. While his audience did not agree with his figures entirely, the general idea of attack seemed to be well received.

In his analysis, Mr. Geisse started with a "representative" airplane. He then mathematically varied the weight, fuel consumption, horsepower, and attempted also to allow for reliability and durability changes, all in cost figures. In doing this he assumed engine cost to vary directly with weight. According to his figures, as shown in the table below, increased specific weight, accompanied by a higher compression ratio and lower volumetric efficiency (the last two designed to balance each other to give the same detonating qualities), show an actual saving in operating cost, in addition to the gains which should be found from increased durability and decreased cooling troubles.

Mr. Geisse also recommended the adoption of powerplant weight per pound of thrust, rather than pounds per horsepower as a weight rating. This, he said, would of course place the problem of cowling and propeller design on the shoulders of the engine manufacturers, but that such standardization should be of benefit from a cost angle to the industry.

This latter suggestion aroused quite a little dissenting discussion. It was stated variously that cowl design depended too much on the type of fuselage, that it depended too much on the speed of the ship, etc. Mr. Geisse had a supporter, however, in Mr. Merrill, of Continental Motors, who

said that the cowling might be made to stop at the center line of the cylinders, the remainder being for the plane manufacturer to determine, and that it was up to the engine manufacturers to control cooling by cowl design. Mr. Cummings, Bureau of Standards, interjected that the history of N.A.C.A. cowling development showed that cooperation between both plane and engine manufacturers was the real requirement.

The possibility of having liquid-cooled engines without radiators or pumps in the future was suggested by Mr. Geisse in his discussion of Mr. Frank's paper. In tests conducted on Wright E-4 engines, Mr. Geisse found that the water jackets, when using ethylene glycol for cooling at outlet temperatures of 300-350 deg. Fahr., formed excellent radiators when exposed to the slipstream. The advantage over air-cooling directly would be a more even heat distribution. Corrugations or small fins of the "wing radiator" type could be added to the jackets, and the thermo-syphon circulation used, eliminating plumbing. With reference to in-line and Vee type air-cooled engines, he stated that the gain anticipated from reduction in frontal area had been largely offset by the necessity of adding air scoops and ducts, and that these could be eliminated by diffusing the heat with ethylene glycol or similar high temperature liquid cooling.

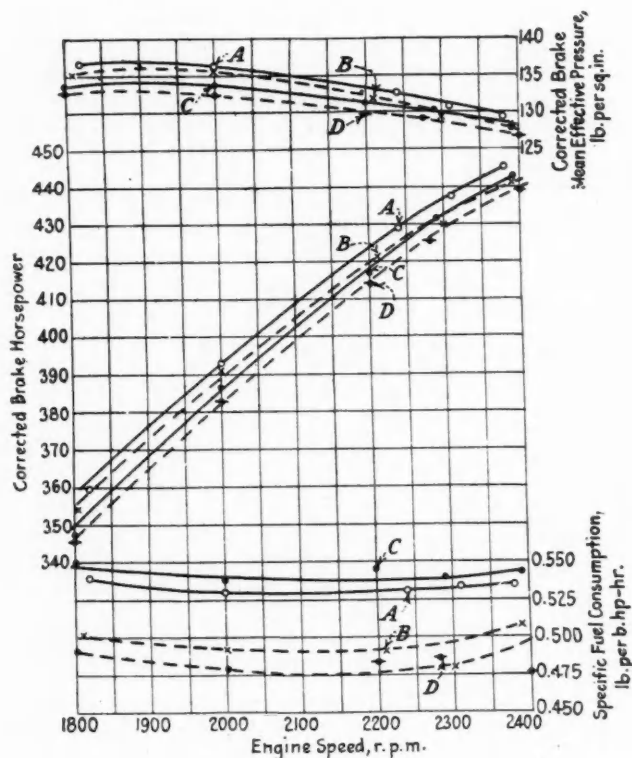
The major advantage, pointed out by Mr. Frank, of Prestone cooling at high temperatures was the lower fuel consumption obtainable, economy figures running as low or even lower than .40 lb. hp.-hr. in spite of increased detonating tendency as pointed out by Mr. Geisse. Harold Caminez, Allison Engineering, thought that this lowered fuel consumption might be due largely to the lowered friction horsepower with the higher operating temperature. Mr. Caminez also stated that ethylene glycol cooling is patented by the Union Carbide and Carbon Co.

Following is an abstract of Mr. Frank's paper:

Investigations were divided into five parts, a Curtiss V-1570 and a Curtiss D-12 dynamometer test, D-12 endurance test and flight test, and D-12 high compression-ratio and high rotational speed dynamometer test. Cooling medium used was Prestone, and Ethylene Glycol (for earlier report on this see *Automotive Industries*, of April 13). Outlet temperature of 300 deg. Fahr. was maintained.

**Effect of Increased Specific Engine-Weight on
Operation Cost**

Specific engine-weight, lb. per hp.	2.00	2.47
Costs:		
Airplane	\$6,000	\$6,180
Two engines	7,200	7,200
Fuel for 6000-Hr. operation at \$0.04 per lb.	18,000	17,210
Interest on investment for 5 years at 6 per cent:		
Airplane	1,800	1,855
Engine	1,080	1,080
Total	\$34,080	\$33,525



At the left is full-power comparison curves of the Curtiss D-12 engine after a 50-hr. endurance test at a compression ratio of 5.6 to 1

Leakage of Prestone between cylinder barrel and water jacket and through cylinder head mounting threads were chief difficulties encountered. In the V-1570, the aluminum head also cracked between the valve seat inserts, indicating need for stronger alloy at high temperature cooling. It was also found that more clearance for inlet manifold studs was necessary, due to increased longitudinal expansion. A new type of hose connection which will not be affected by Prestone at 300 deg. is also necessary.

Advantages found were 3 per cent decrease in fuel consumption, offsetting a 1 per cent decrease in power at higher temperature. Better manifold heating is possible. Radiator size can be decreased 70 per cent. Total installation weight is reduced. Parasite resistance is reduced.

Data on Cooling Media and Their Temperatures, the Carburetor Settings and Fuels Used Are Given Below.

Curve	A	B	C	D
Cooling Medium	Water	Water	Prestone	Prestone
Outlet Temperature, deg. Fahr.	180	180	300	300
Carburetor Setting	Full Rich	Best	Full Rich	Best
Fuel				
Benzol, per cent	20	20	40	40
Domestic Aviation Gasoline, per cent	80	80	60	60

Lindbergh Inspects Packard Diesel Engine



Colonel Charles A. Lindbergh and Captain Lionel M. Woolson, aeronautical and research engineer of the Packard Motor Car Co., are shown above viewing the new Packard Diesel engine mounted on a Stinson-Detroit plane

COLONEL CHARLES A. LINDBERGH is shown in the above photograph inspecting the new Packard Diesel engine for airplanes installed on a Stinson-Detroit plane. Captain Lionel M. Woolson, aeronautical and research engineer for the Packard Motor Car Co., and designer of the powerplant, is pictured explaining the details of the engine to Colonel Lindbergh. To the

extreme right is Walter Lees, Packard pilot. It will be recalled that Colonel Lindbergh and Major Thomas G. Lamphier, were guests recently of the Packard company as officials of the Transcontinental Air Transport Company at Detroit. During this visit, Colonel Lindbergh made a test flight of the craft equipped with the Diesel engine.

Wing Design Has Definite Limits When Analyzed by Mathematics

Discussion of fundamentals underlying subject by Ralph H. Upson, of the Aeromarine Klemm Corp., proves to be of high interest at Cleveland Airplane session.



C. H. Chatfield, who recently resigned as Professor of Aeronautics, Massachusetts Institute of Technology, to assume the position of Aeronautical Engineer, Pratt & Whitney Aircraft Co., presided at the airplane design session of the S.A.E. Aeronautic Meeting

TWO papers were presented at the airplane design session at the Aeronautic meeting of the S.A.E. held in Cleveland last week, one on wing design, by Ralph H. Upson, Aeromarine Klemm Corp., and one on Department of Commerce load factors, by Alfred S. Niles, Prof. of Aeron. Engineering, Guggenheim Aeronautical Laboratory, Stanford University.

It was rather unfortunate that more time was not available for a discussion of Ralph H. Upson's paper on "Wings—A Coordinated System of Basic Design," at the airplane design session. Mr. Upson's mathematical analysis of the fundamentals underlying wing design certainly proved of the highest interest, and would well form the subject matter of a textbook on this subject, although, as Mr. Warner and Mr. Upson pointed out, there were very definite prac-

tical limits to the mathematical analysis which could not be over-run.

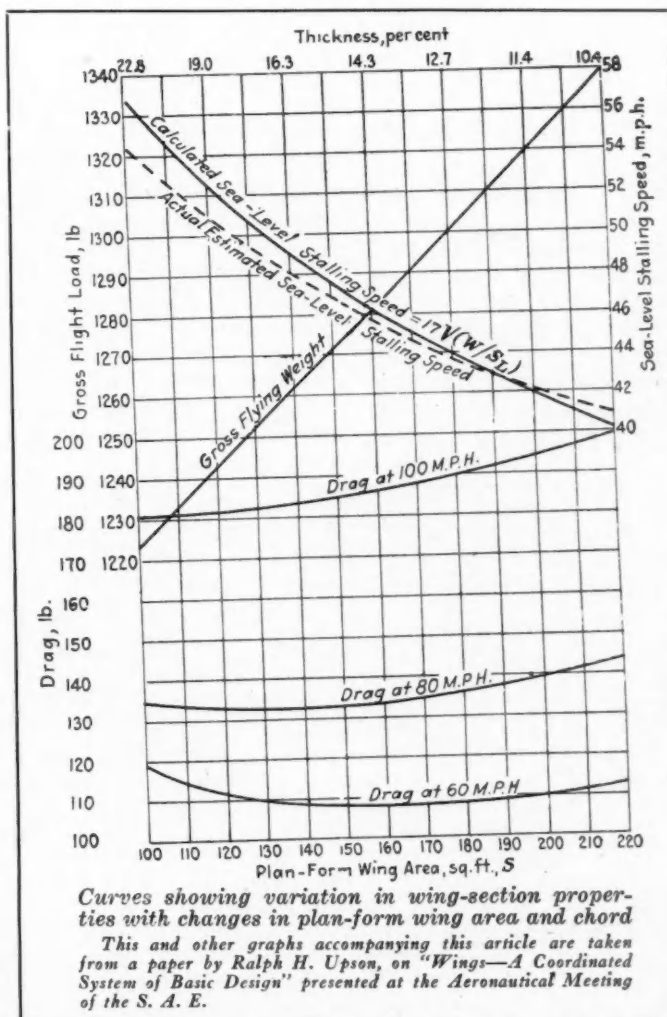
Starting by taking as basic requirements such fundamental characteristics as can be separated from wing design, Mr. Upson discussed the independent variables, such as geometrical relations as to effect on maximum performance. A weight-drag equation was developed, its reduction to practice was discussed and interesting points bearing directly on practical design were presented. Some of the latter are:

1. The best taper, including both structural and aero-

dynamic considerations, makes the root chord about five times the tip chord, if a wing is to be tapered at all.

2. Fancy wing forms possess no great advantages that cannot be closely approximated by a plain straight taper of proper proportions. Even tip fairings, admittedly of some importance for thick rectangular wings, cease to be of much consequence for a 5-to-1 taper.

3. A set of internally braced wings of ideal proportions has from 20 to 30 per cent less drag, exclusive of that due to the fuselage, and slightly less weight than the best arrangement of rectangular wings, either internally or externally braced, except in a case where bracing with wire alone is possible. Considering also the improved stability and control afforded by tapered wings, the im-



portance of devising economical production methods for such airplanes is apparent.

4. The main diagonal struts of a conventional externally braced monoplane should each be supported by at least one intermediate stiffener. Such an arrangement is superior to a rectangular cantilever wing.
5. Adequate span is the prime essential for any design with a large power loading. Many small airplanes have been failures mainly from this one cause.
6. If the span is maintained, the area can be varied through a considerable range without seriously affecting anything but the stalling speed.
7. A cantilever wing with structural skin, for a light airplane, can often be made surprisingly thin, provided any particularly harmful rate of vibration is not set up.
8. The low-wing monoplane is attractive structurally and has almost perfect vision, but tends to generate induced interference. By proper design this may apparently be minimized, and practically eliminated for power flight.
9. Even an ideally streamlined fuselage can cause trouble if poorly placed in relation to the wings. A forced contraction of flow or venturi effect is especially to be avoided.
10. Unless and until proved relatively harmless in particular cases, any gap between a fuselage or nacelle and a wing should be regarded with suspicion. This becomes of greater importance with the use of National Advisory Committee for Aeronautics cowling. Many designs apparently need serious reviewing in consideration of the latter feature.

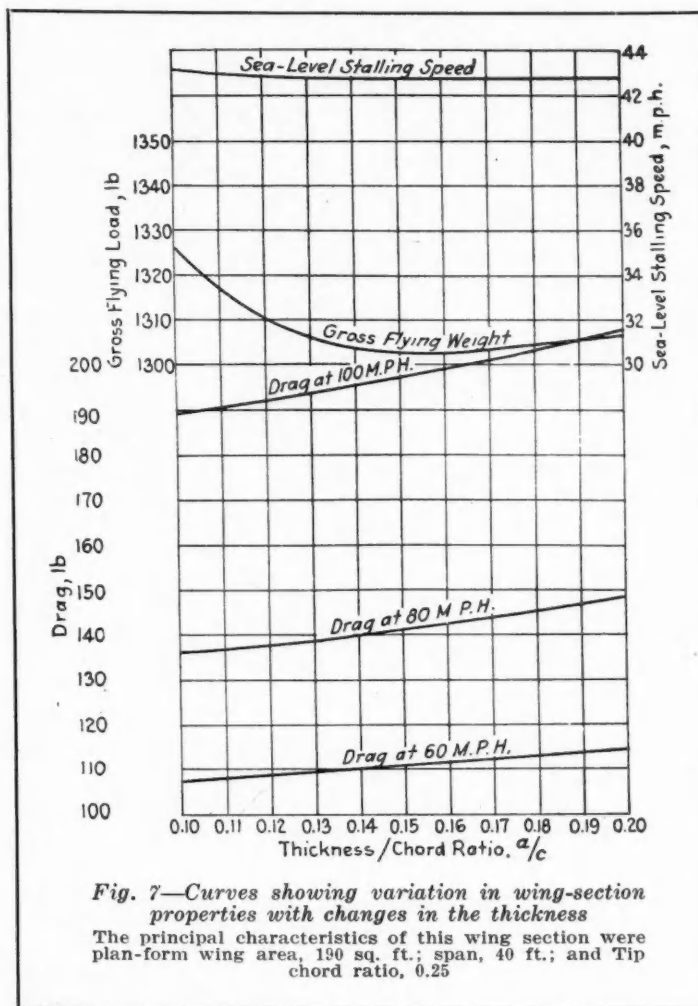


Fig. 7—Curves showing variation in wing-section properties with changes in the thickness
The principal characteristics of this wing section were plan-form wing area, 190 sq. ft.; span, 40 ft.; and Tip chord ratio, 0.25

posed bases for load factors, arrived at the conclusion that specifying minimum allowable braking loads is better than its alternatives. Use of gross weight and power loading as sole criteria, for determination of load factors to be used in a design, he considered generally satisfactory, except that he thought a scheme might be designed for allowing a lower set of load factors to be used for light, heavily powered airplanes not subjected to severe maneuvers. For others, he considered the Department of Commerce factors adequate.

Mr. Niles pointed out that desirable modifications in the department's rules are indicated especially for those relating to wing tips. He suggested that a structural expert be attached to the National Advisory Committee who could study flight test data from the point of view of load factor rule revision. One loading condition which should be revised, according to Mr. Niles, is that for nose-diving, since it makes no allowance for aerodynamic characteristics.

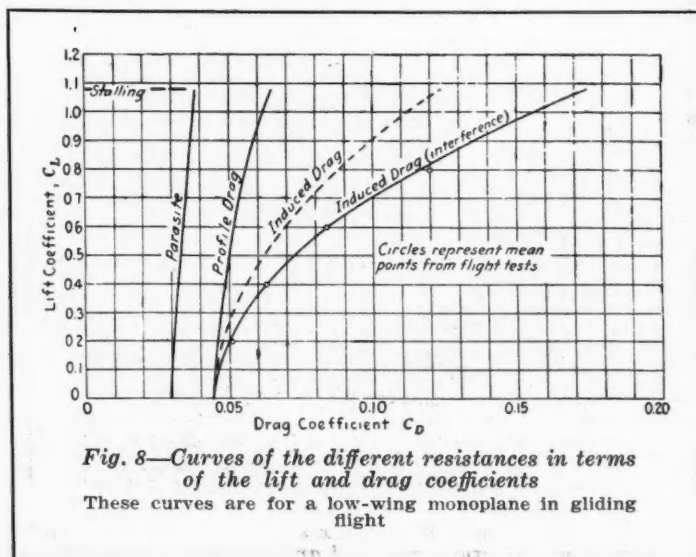
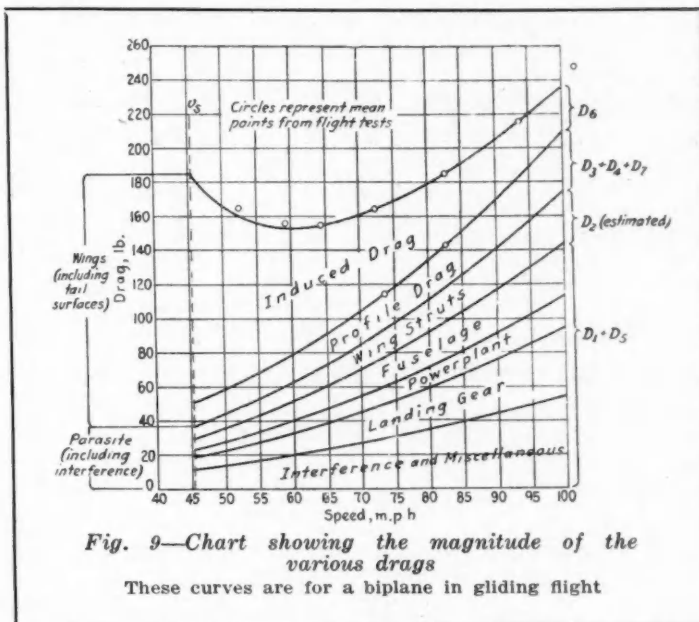


Fig. 8—Curves of the different resistances in terms of the lift and drag coefficients
These curves are for a low-wing monoplane in gliding flight

He also thought that the number of loading conditions required might well be reduced, possibly by combination for specified classes of design. While he recommended substitution of stress analysis for static tests wherever the former are easier to make, and reliable, he did not consider it a hardship to require constructors to furnish either a static test to failure or stress analysis of every main structural part, regarding these as essential, and the static tests as the only safe final check for production ships.

In discussing Mr. Niles' paper, which he himself presented from Mr. Niles' viewpoint, E. P. Warner dissented regarding a statement made in the paper that planes reach maximum load factors only at low speeds. He suggested that a sign be put on the dash of planes stating that it should not be dived and pulled out beyond a certain speed. On



the advisability of attaching a structural engineer to the NACA he was in perfect agreement with Mr. Niles.

Mr. Warner also recommended study of load factors in bumpy air, on which, Mr. Niles pointed out, little was known. Tests so far, according to Mr. Warner, have been purely negative, Lieut. James Doolittle having found a maximum load factor of only 2.5 in considerably bumpy air with an accelerometer. Mr. Warner stated that some western hailstorms have been estimated to correspond with vertical air velocities of 60 m.p.h.

Further suggestions regarding Department of Commerce rules related to side load conditions for wide tread landing gears with heavy loads, and changing the rule imposing tail loads in proportion to gross load without reference to maneuverability as affected by varying engine installations.

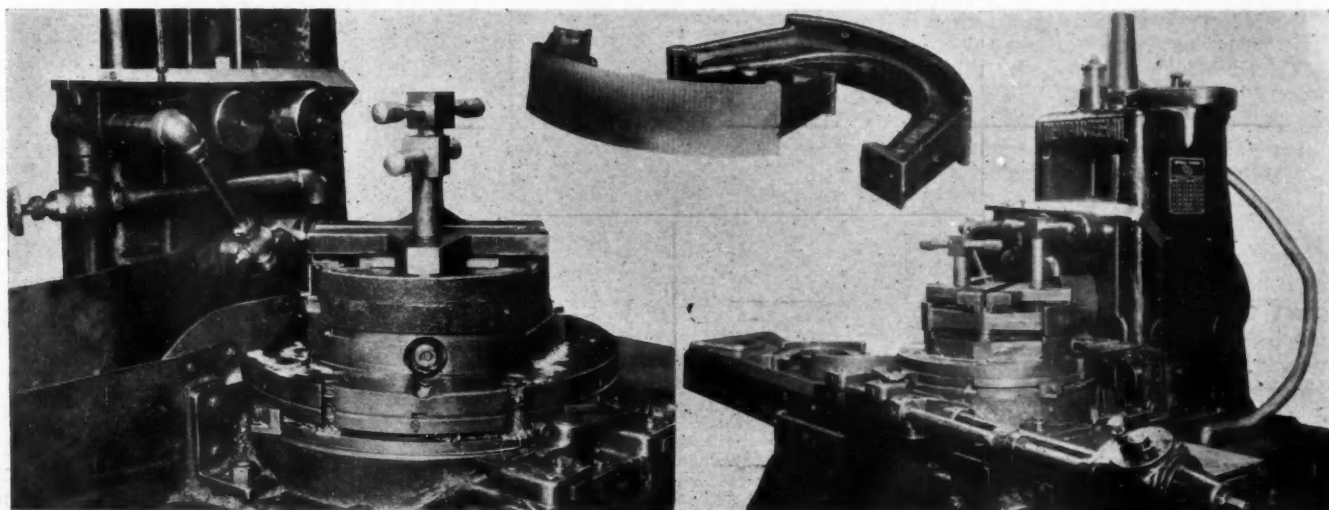
Circular Milling of Brake Shoes

ONE well-known automobile company makes use of the equipment shown to circular mill the periphery of its brake shoes and obtains an output of 80 pieces per hr. using a peripheral speed of 17 in. per min. with the cutter running at 135 ft. per min.

The machine is a Mil-Waukee-Mil Simplex, without arm braces, equipped with a 21 in. diameter, skip-stop rotary table carrying a simple, two-station hand-clamp-

ing fixture. Two pieces of double link brake shoes are mounted in the fixture, are located on a hardened shoe and against two stop pins, and are held in position by two hand clamps.

Four dogs on the periphery of the skip-stop table control the milling cycle. As one shoe is being cut the operator loads pieces on the other side of the table so that cutting time is practically continuous.



At the right is pictured a Mil-Waukee-Mil Simplex set up for circular milling brake shoes. To the left is a close-up of setup showing fixture and tool arrangement. Brake shoes which are to be circular milled are shown in the insert

Application of *Light Alloys* For Aircraft Use Described

Two papers on aluminum, one on welding airplane parts, an address on Beryllium and motion pictures of the all-metal dirigible test flights feature session of the S.A.E. meeting.



G. D. Welty, Aluminum Co. of America, provided the aircraft engine builders with a new textbook on the application of aluminum alloys in his paper on that subject

The first paper, "Service Characteristics of Light Alloys," by E. H. Dix, Jr., Aluminum Company of America, dealt largely with the subject of corrosion of aluminum alloys, classifying the various alloys used largely for sheets, according to corrosion resistance. In salt water, electro-deposited rubber is said to be the only coating that gives satisfactory protection against corrosion of magnesium and magnesium alloys. Mr. Dix also stated that accelerated weathering tests were extremely difficult to interpret in terms of service conditions. Hot water quenching, Mr. Dix states, makes alloys more susceptible to intergranular corrosion.

G. D. Welty, also of the Aluminum Company, presented the second paper, "Modern Light Alloys and Their Application to Aircraft Engine Design," in which the author discussed the more important commercial alloys of aluminum with respect to their physical characteristics, methods of fabrication, and to what use they are best suited. A new light piston alloy was also discussed, as well as magnesium alloys, with special recommendation of conservatism regarding their use, especially for cylinder heads, pistons, etc., where thermal conductivity is an important factor, or where resistance to corrosion is important.

In an informal discus-

TWO papers on light alloys, one on welding aircraft parts, an informal address by Beryllium and motion pictures of the construction and test flights of the ZMC-2 all-metal dirigible, were presented at the light alloys session of the S.A.E. Aeronautical Meeting held in Cleveland last week.

sion of Beryllium with respect to properties and cost estimates, C. B. Sawyer, of the C. F. Brush Laboratories, stated that in density it was the equivalent of magnesium, in strength and elastic modulus the equivalent of steel, that it had about the same melting point as cast iron, and had a higher resistance to corrosion than aluminum. Ductility is rather poor, the grain structure being hexagonal and more in the zinc class. Little is known of its casting properties, according to Mr. Sawyer. A 60 per cent beryllium aluminum alloy has shown a tensile of 60,000 lb. heat-treated, according to the author also.

With respect to costs, Beryl ore can now be obtained at around \$50-\$60 a ton from several sources, and Mr. Sawyer expects this to drop to around \$20-\$30 shortly, bringing beryllium cost to around 37 to 56 cents per lb. Extraction of the aluminum oxide from the ore should also reduce the cost, through sale of this by-product. He said that a production cost of \$1.50 to \$1.80 per lb. appears well near being realized.

Correct heat was given as the most important detail in the welding of aircraft parts, by R. M. Mock, Belanca Aircraft Corp. Other recommendations made by the author were: the elimination of edge welds; welding from one side only when very light gage material is employed, and taking care that undue internal stresses are not set up while cooling. In training welders, green men have found to be a more economical and better source, since they did not have to unlearn habits acquired through experience in welding heavier forms.

In the discussion of the light alloy papers, Mr. Dix, in replying to Mr. Bolton of Keystone Aircraft, stated that the magnesium alloys had approximately a "C" rating when referred to the aluminum alloy corrosion

table given in his paper. With magnesium this was due, of course, to the fact that it was largely used for castings, in which pitting and surface corrosion was not as important a factor as with the sheet metal alloys for which this table was designed.

Mr. Welty added to this statement of difference in corrosion characteristics between castings and sheet, the point that electrolytic action with castings, especially in use in flying boats,



Feature of the light alloys session of the S.A.E. meeting at Cleveland was the presentation for the first time of motion pictures of the construction and flight tests of the Aircraft Development Corp.'s all-metal dirigible. This view shows the airship landing at the Cleveland Airport during race week. Note the eight fins in place of the usual four

was far more important than atmospheric corrosion. Permanent mold castings also came up for discussion, and it seemed to be the consensus of opinion that they were more economical than sand casting, since the decreased weight through improved properties would more than offset the increased cost, especially as higher production is reached.

In answer to a question on relation of salt spray and alternate immersion tests for corrosion, Mr. Dix said that they checked each other pretty closely, 48 hrs. in the latter type of test being equivalent to about three months in the former. In the latter, however, hydro-

gen peroxide was used in salt water to accelerate intergranular corrosion.

With respect to nitrate heating of aluminum alloys, Mr. Dix also said in reply to a letter from L. C. Milburn, Glenn L. Martin Company, that the nitrate must be carefully removed by a hot wash after cold water quenching, to prevent corrosion, or better, that electric furnaces be substituted for nitrate baths. Development of electric furnaces capable of taking care of heat-treatment of aluminum sheets, was cited as essential by Mr. Dix, at the conclusion of the discussion on light alloys.



Frank W. Caldwell, consulting engineer, Standard Steel Propeller Co., was active in the discussion at several meetings. He also presented a paper on variable pitch propellers

Aircraft and Airport Lighting Were Major Topics at S. A. E. Standards Session in Cleveland

POSSIBLE standardization of aircraft and airport lighting, furnished the major topic for the standards session of the S.A.E. Aeronautical Meeting at Cleveland last week, although instrument mounting and design, wheel rims, airplane fittings, propeller hubs and engine hard-

boundary lights were better; 2. Whether flood lights should be grouped or separate; and 3. How to signal individual commercial planes selectively.

Mr. Warner at this point brought in the desirability of international standardization of lighting and signaling methods, because of our tie-up with European standards or possible standards both through Canada and the British Empire, and through cooperative airline operation in South America. Further on International Standardization, Mr. John R. Cautley, Bendix Corp., said that such a program as least as regards tires and wheels was impossible at present due to the almost universal use of clincher tires abroad. One British company, according to Mr. Cautley, has 79 standard wheel sizes and 29 standard tire sizes.

In a discussion of navigating instruments and their mountings, Wesley Smith of National Air Transport said that the solution was not to be found in vertical or horizontal normal flight positions of indicators, but in the radial arrangement of all pointers, meeting in the center of a single large dial for normal straight ahead flight.

In a discussion of future standardization activity, P. C. Bolton, Keystone Aircraft Corp., requested standards for aluminum alloy lugs differing for mountings where they are either in straight tension, or where stress reversals occur. In the latter case elongation of holes has been noted. Gustaf Carvelli, Curtiss Aeroplane and Motor Co., also requested consultation with machine tool manufacturers before setting tolerances on further propeller hubs, such as the S.A.E. No. 50 size. Difficulty in machining other sizes to specified tolerances has been experienced according to Mr. Carvelli. Also on propellers, Frank W. Caldwell, Standard Steel Propeller Co., requested the standardization of a hub smaller in size than that for the OX-5. At present, Mr. Caldwell stated, there are approximately 30 different types and shapes of shaft ends smaller than the No. 1 S.A.E. standard, not interchangeable with OX hub. This request was referred to the engine section.

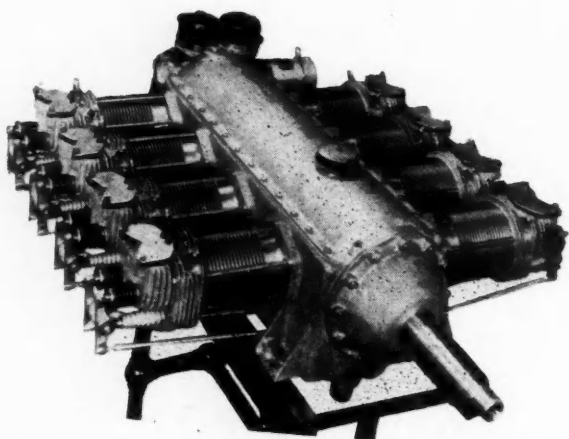
W. M. Johnson, National Lamp Works, also requested standardization of clevis bolts and closer tolerances of threads for bolts in shear. Aircraft engine hardware for standardization was suggested by J. F. Hardecker, Naval Aircraft Factory.

ware also came in for their share of discussion.

Two committee reports were received. In the first, that of the Aircraft Lighting Committee, W. M. Johnson reported the progress to date on design and installation of experimental equipment. Two types of lights are being furnished cooperating operators of airlines; a fixed beam type and a directional type with various lens forms enabling beam spreads of from 2 to 40 deg. in either horizontal or vertical, or both directions. Included also in the test equipment was a voltage regulating generator, storage battery and wire harness.

The second report, that of the Tire and Rim subcommittee, presented by B. J. Lemon, recommended a 1/16 in. increase in well depth of 10-12 in. drop center rims. The recommendation was adopted.

Leading off a discussion of airport lighting standardization, a description of the Donaldson system at the Grosse Ile airport in Detroit, was given. This system comprises flood lights flush with the ground, so that landing planes can roll over them without difficulty if struck, and arranged in series along selective runways. A wind-vane controls the lighting of the particular runway which faces into the wind at any particular time. It was requested that the S.A.E. cooperate in testing this installation for possible recommended standardization. E. P. Warner, President of the Society, thought that this was probably more nearly the function of the Department of Commerce. L. C. Porter, of the Edison Lamp Works, General Electric Co., suggested that a good point in standardization might be solving the questions of: 1. Whether flashing or stationary



Added to its line of engines by Dayton Airplane Engine Co. is this eight-cylinder air-cooled powerplant developing 225 hp.

ALTHOUGH the Cleveland Aeronautical Exposition, held in conjunction with the National Air Races, Aug. 24 to 31, attracted new products not heretofore shown, from a number of manufacturers, it did not in itself continue the history of recent major aeronautical shows, in establishing new records either for number of products exhibited, or for attendance.

Most of the old-line manufacturers were represented, of course, although in the case of the Curtiss, Cessna, etc., the representation was through the Curtiss Flying Service rather than through the parent companies. Also in evidence, as usual, were a number of companies not heretofore represented at exhibitions, but the show did not succeed in being representative of the airplanes manufactured in this country. A good deal of this was due no doubt to the Air Races themselves, and congregation of larger numbers of airplanes at the airport. Second in importance, perhaps, but still largely influential was the lack of

Aeronautical Exhibi Included Units of

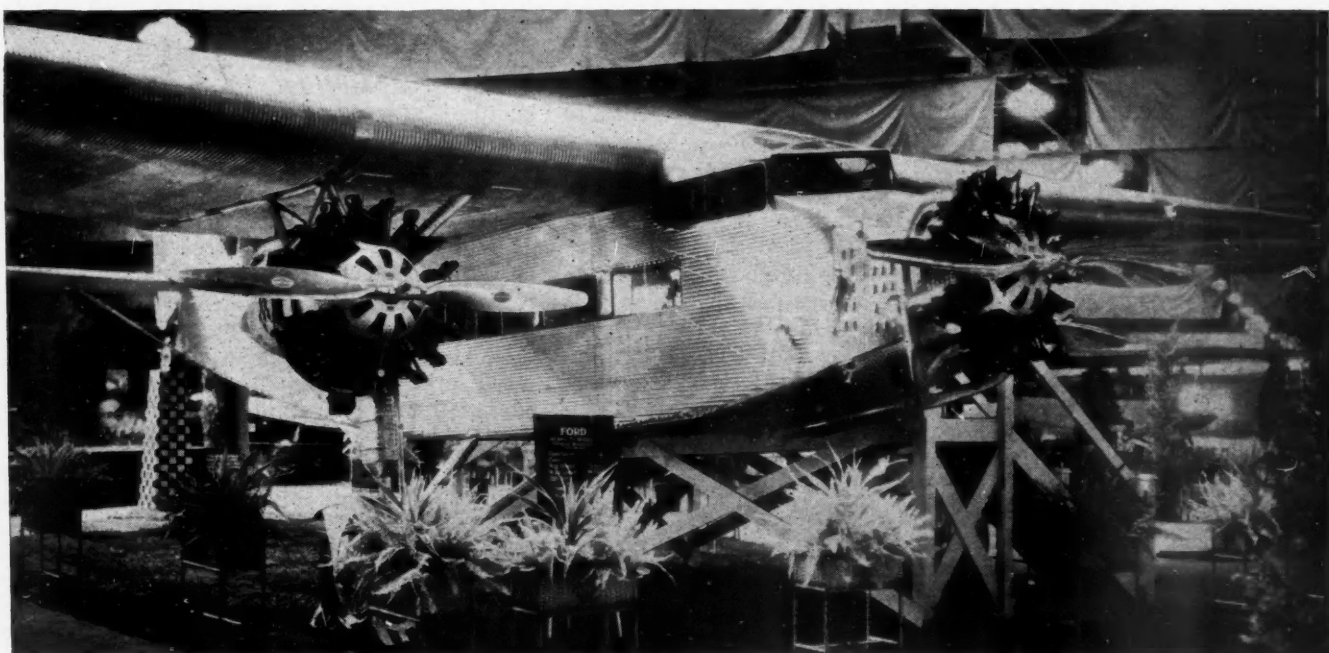
*Two new engines, one developed
and the other by the Dayton
several aircraft were*

accessibility of the Cleveland auditorium to the airport and transportation facilities.

There seems to be but little doubt that had the exposition been held at or adjacent to the airport, providing suitable accommodations were available, representation and attendance would have been enormously increased at both activities, even considering the inaccessibility of the Cleveland airport from downtown sections.

Space does not permit here a review of the exposition in its entirety. Moreover, most of the products are well-known to the industry. Of those that have not been shown previously, there were two new engines, and several new planes.

One of these, a five-cylinder air-cooled radial of 144 hp. at 1750 r.p.m. is the product of General Air Motors Co., Inc., of Scranton, Pa. One of these engines is now undergoing Department of Commerce type tests, according to executives of the company, pending the outcome of which the engine will not be put into production. Features of this engine are a three-valve head, with two intake valves operated by a single forked rocker arm, and a new method of head attachment. Frontal design, as will be noted from the accom-



Ford air transport, Model 5 14-passenger monoplane, shown above, was a feature of the Cleveland show

tion at Cleveland *Most Companies*

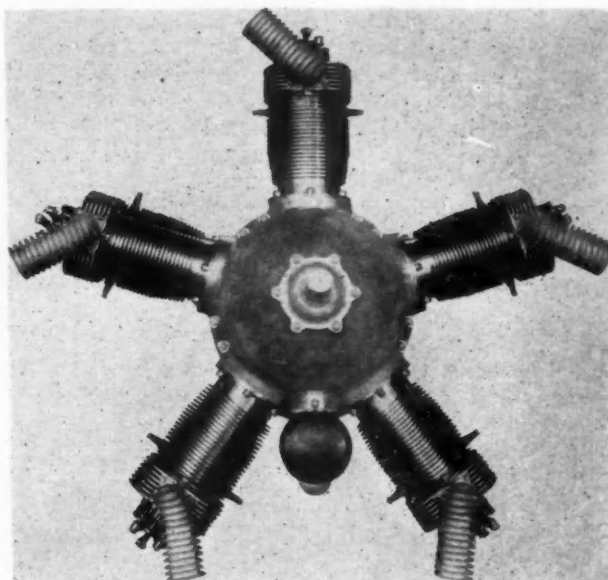
*by the General Air Motors Co.,
Airplane Engine Co., and
introduced at the show.*

panying photograph, is exceptionally clean, all accessories being located at the rear. Barrels are of forged carbon steel and of the cup type with valve seats in the steel. Cylinder heads of Bohnalite are cast with two intake ports and one exhaust, and are secured to the barrel by means of a forged steel circumferential clamp, said to be designed to allow for head expansion. To assure heat transfer from the steel to the aluminum alloy head, companion faces are scraped and lapped.

Rocker arms are assembled in a single unit and by means of a single bolt to the cylinder head. They are mounted on ball bearings with large lubricant reservoir, which is said to decrease necessity of lubrication to once in only several hundred hours.

The crankcase is of the split type, with a split shaft also, and solid master rods. Link pins are arranged on the latter for equal impulses. The crankshaft is supported on three ball bearings as usual. Pistons are of the slipper type.

An unusual feature of the engine is a compression

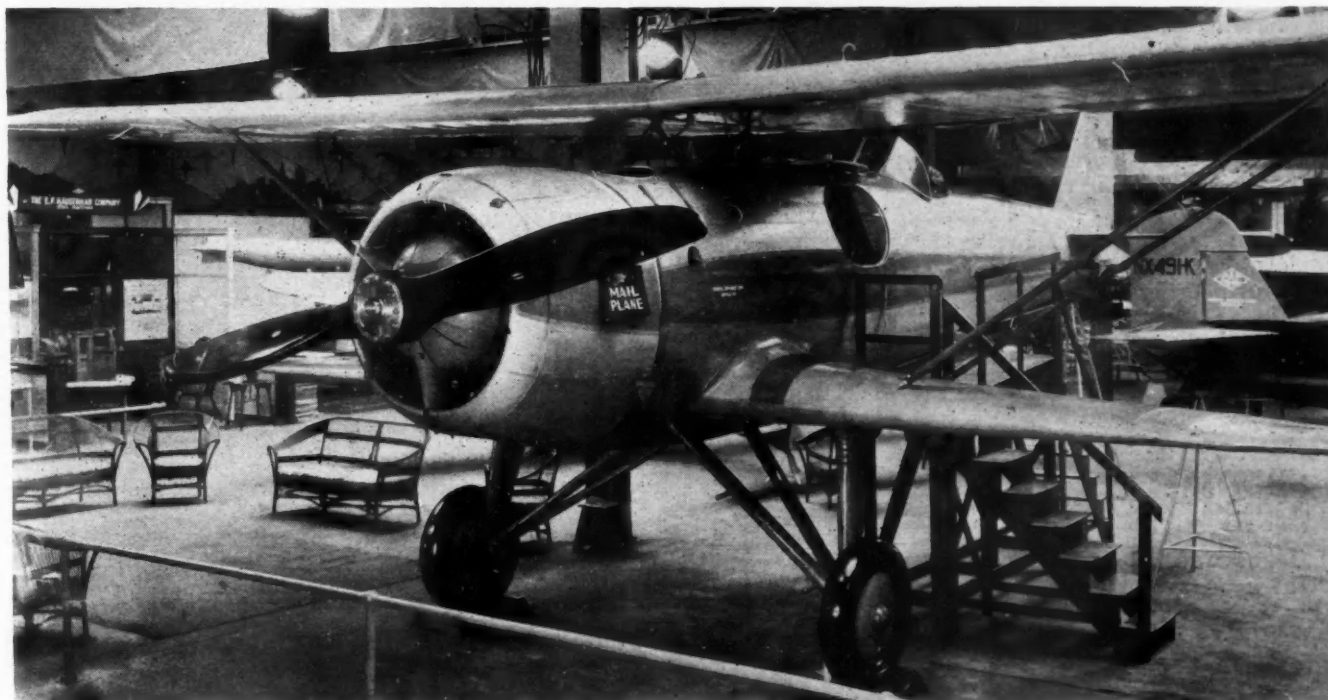


A new entry in the aircraft engine field is represented by the first showing of the Moore engine (pictured herewith) produced by General Air Motors Co.

control mechanism, which, through a spiral keyway in the altitude adjustment driving gear, reduces the cylinder compression.

A rotary induction system is provided, with single outlets for each cylinder, the manifolding itself splitting half way to the valves, with the pushrods passing up between the two halves.

A 2½-in. brass pipe passes through the oil sump, serving as heater for the carburetor air intake. Carburetor is a Stromberg NA-R5A, with two Scintilla magnetos and provision for Heywood starter.



General Airplanes Corp. exhibited this new Mailp'ane with dural monocoque fuselage and a number of other interesting developments.

The second new engine was the Dayton Airplane Engine Co.'s 225-hp. horizontal opposed 8-cylinder air-cooled powerplant. This engine has its cylinder assemblies interchangeable with its other types of engines. It is also of clean external design and seems to be particularly applicable for wing engines of multi-motored planes, if a system for building the engines into the wings and providing air ducts through the leading edge, etc., can be worked out. Or the engine nacelles themselves can be converted into airfoil sections.

The crankcase is of the barrel type and through its simple design capable of very sturdy construction. Crankshafts are of the 90-deg. four-throw type, with side by side opposed rods, the cylinders, of course, being offset. A single camshaft, below the crankshaft, is used. A feature of the engine is that it can be completely disassembled without removing it from the plane, a cover being provided on the top of the crankcase for accessibility to main bearings, etc. Engine bearers are on the lower crankcase side. The powerplant is designed for either double battery-distributor or double-magneto ignition. Spark plugs for accessibility are both placed in the upper head side of the cylinder.

Of the new planes, one of the most interesting proved to be a 2000-lb. payload Mailplane offered by the General Airplanes Corp. of Buffalo. It is powered with a single Pratt & Whitney Hornet, geared for quick take-off and climb, and faired into the fuselage by means of the NACA cowl. The latter also has the novel feature of having a ring type combination oil tank and cooler incorporated in its nose. For quick oil heating, an electric heater is provided near the outlet of this tank.

The ship itself is of the Sesqui-plane type, adaptable either to land or float type undercarriers. A dural monocoque forms the fuselage, which not only furnishes excellent streamlining, but also offers an unobstructed mail compartment of 175 cu. ft. capacity. The latter is located at the center of gravity of the ship, with the pilot's cockpit to the rear. The latter is provided with seat adjustable in both directions, conventional controls, cockpit heater and ventilators.

Wings are of the medium high lift type section, using a specially developed wing curve, upper wings having tapered and washed-out tips. Lower wings are fully tapered and fairly short. The upper wings are of semi-cantilever design, with a single set of two parallel inclined struts at either side. Two-bay wire bracing is provided between the struts, due to their

length. The wing construction is composite, with spruce beams, aluminum alloy rivs, and chrome-molybdenum center section beams. Movable surfaces throughout are of chrome-molybdenum tubing with fabric covering. The ailerons are differentially controlled with varying slots. The stabilizer is adjustable, as well as the vertical fin. A drift compensator is provided for the rudder control, and all surface controls are provided with ball bearings, packed with lubricant at the major points.

An unusually large amount of deflection is provided in the split undercarriage and for the tail wheel. The former has a combination oleo and rubber ring shock absorber system, with the rubber above the oleo gear to guard against deterioration from possible oil leakage. Bendix brakes are standard.

Another feature of the ship is the provision of a muffler pipe extension from the collector ring along the bottom side of the fuselage to back of the mail compartment. Gas tanks are mounted in the upper wing and have a capacity of 135 gal. Equipment includes

Eclipse inertia starter, ignition booster, 12-volt battery, 15-volt generator, 25 amp., shielded electrical system and wiring for radio installation, 12-in. retractable landing lights, and flush-type navigation lights.

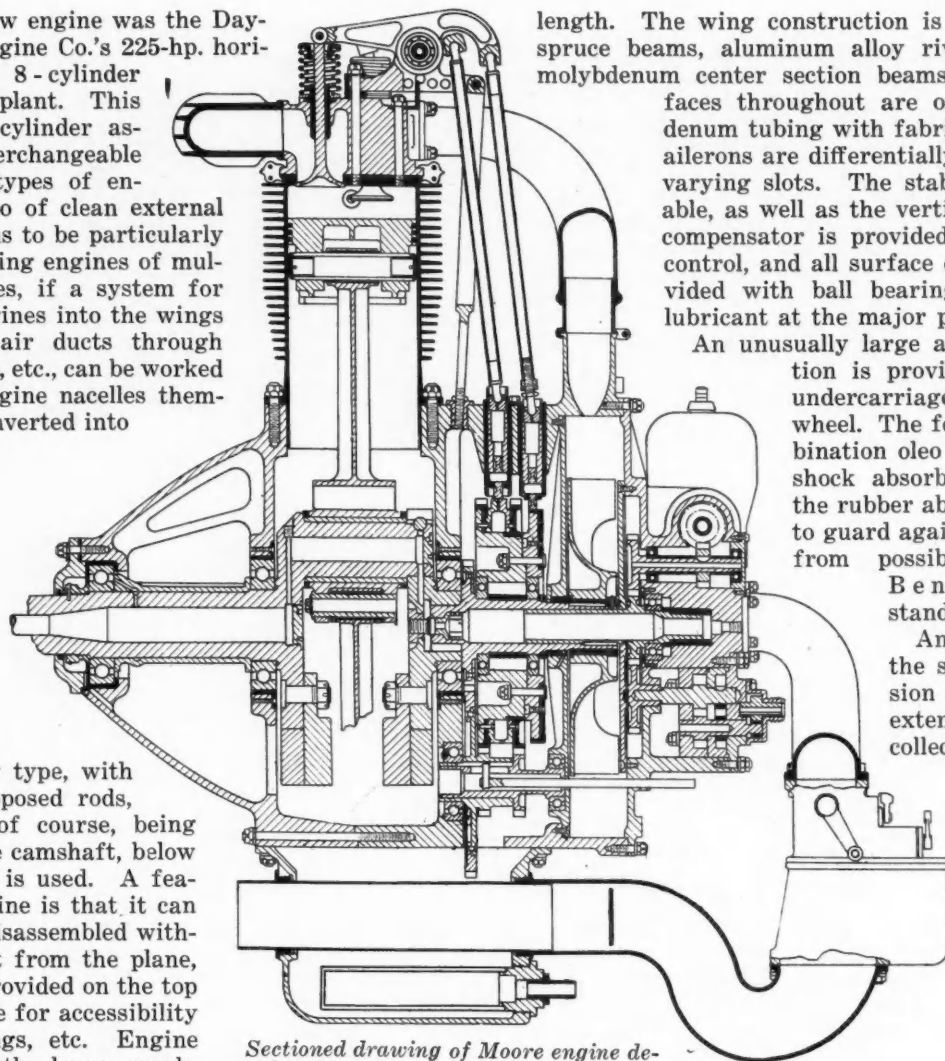
In addition, General Airplanes also exhibited its new parasol monoplane training plane, fitted with Warner engine. The main features of this ship are the provisions to insure maximum visibility, by using a center section cutout and window, oversize landing gear, of the same type as is used on the "Aristocrat" cabin plane, for safety in novice landings and convertibility into a closed cockpit ship. The undercarriage is of the spreading type cantilever design, with streamlined legs. A steerable tail wheel is provided.

Structural materials are conventional with chrome molybdenum steel tubing for fuselage and control surfaces and wood wings, all fabric covered.

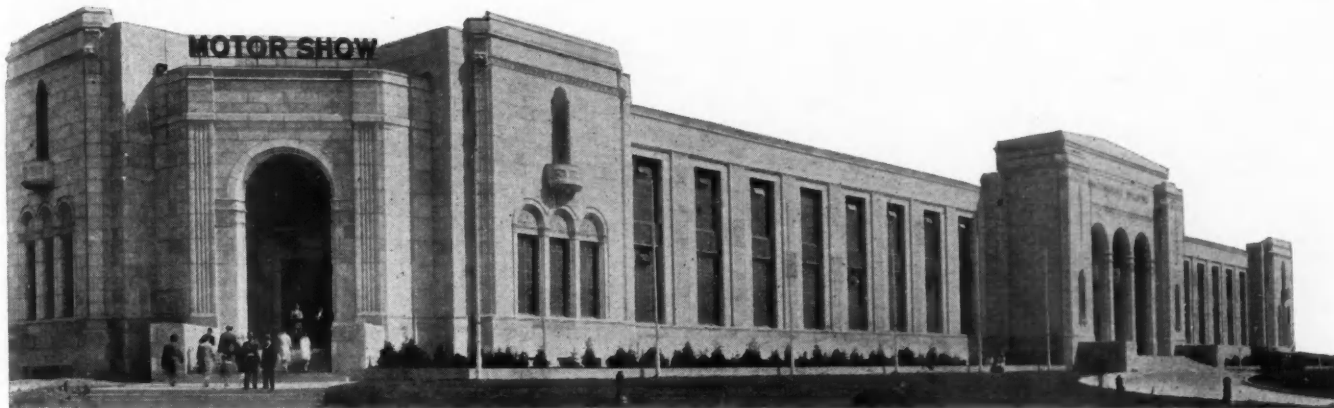
Of the other new planes, there was an open cockpit tandem two-seater semi-cantilever monoplane, wire-braced, produced by Emsco Aircraft Corp. (see *Automotive Industries*, Aug. 24, 1929). It is featured by semi-low wing mounting and landing wheel fairing covers.

R. D. Bone Co., Los Angeles, exhibited its Golden Eagle parasol tandem cockpit monoplane with externally braced wing, priced at \$2,500, less engine. It is designed for 100-hp. engine installation.

(Turn to page 346, please)



Sectioned drawing of Moore engine developed by the General Air Motors Co.



The Automotive Palace of the Canadian National Exhibition, shown above, was built in four months, in time to house the Motor Show at Toronto, which closes today

Canadian Motor Show Included Forty American Car Exhibits

Pre-announcement displays of the new Packard and Cadillac lines for 1930 were features of the opening of the National Exhibition at Toronto last week.

By WARREN B. HASTINGS

Secretary, Canadian Section, S.A.E., and Editor, "Canadian Motorist"

THE Canadian National Motor Show, held in conjunction with the Canadian National Exhibition at Toronto, Aug. 24 to Sept. 7, occupied for the first time the new million-dollar Automotive Palace constructed by the exhibition corporation to house the motor show. The new building was devoted almost exclusively to passenger cars; trucks, tractors, motorcycles and airplanes occupying other buildings on the exhibition grounds.

This year's Canadian National Motor Show was the largest ever held in the Dominion. In makes of cars represented it rivaled for the first time the Grand Palace

Show in New York City and the Coliseum Show in Chicago. There were shown 44 makes of cars, nearly half that number of makes of trucks and buses and approximately 50 automotive equipment exhibits, including tire and oil displays. There were no duplicate exhibits. Four of the 44 makes of cars represented were of English manufacture—Isis, Morris, Rolls-Royce and Vauxhall. The rest were United States-Canadian makes. Among the pre-announcement new models displayed were the Cadillac and the new Packard lines for 1930. Constant crowds surged around the front-drive Cord, the General Motors Pullman-Buffer Bus, the



The great majority of automobiles displayed at the Canadian Motor Show were of American manufacture. A section of the exhibition space is pictured herewith



Pre-announcement displays of the Packard for 1930 and the new Cadillac featured the Canadian Motor Show. Above is a photograph of part of the Automotive Palace main floor during the show, with the new Packard models in the foreground

Bonne Entente II and the Morris Minor exhibits, many of the crowd apparently confusing the baby Morris with the rumored \$200 mail order car.

The Automotive Palace has cost something over a million dollars to date. On the main floor and a mezzanine girdling the structure there are a fifth of a million square feet of floor space. The structure is of stone, concrete and steel. Four months ago the first sod was turned preliminary for excavating for the foundation of this great structure. It is of simple, chaste yet boldly prepossessing architecture.

The mezzanine floor is approached by four wide stone stairways, one on each side of the main entrances of the building, and by a large heavy duty elevator. Interior finish design and appointments, partially to be completed after the show, are very much finer than are usual in edifices of this kind. Extensive and effective use has been made of ornamental wrought iron with the Venetian green oxidized-copper finish in balustrades, stair rails and the Spanish grill work of the windows. Stone columns will encase the steel H-beams that extend to the roof. The general decorative scheme will be in stone colored crystalline stucco covering the now-exposed brick that line the stone walls within.

Special attention has been paid to illumination, both natural and artificial, not only for artistic effect, but also to obtain a diffusion that will preclude abnormally glaring high lights and depths of shadows on the brilliantly-finished bodies. The objective has been the normal chiaroscuro of outdoor daylight somewhat mellowed. The windows, to this end, have been fitted with trans-

lucent amber-tinted "actinic" glass, and all electric fixtures are of the diffusing type.

Among its many attractive features are: a restaurant, smoking rooms for men, a rest room for women and a committee room. Symptomatic of the vitality, driving force and vision of the automotive industry is the fact that before the first sod was turned for the Automotive Palace the Canadian National Exhibition officials announced that every foot of floor space had been subscribed for, and practically all of it on a 10-year lease contractual basis.

Practically every automotive industrial leader in the United States has visited the show. It has been said that Henry Ford delivered his one and only speech here. As to the verity of that assertion one is skeptical even though one was present when Mr. Ford spoke graciously though briefly at that automotive day luncheon several years ago.

There were gathered at the Canadian National Exhibition directors' luncheon in the new Automotive Palace dining hall Aug. 29 the chiefs of all the Canadian car, truck, bus, tire, oil, equipment and accessory manufacturing companies as well as leaders in the Canadian automotive trade and consumer fields.

Premier G. Howard Ferguson officially opened the building at the close of his address. W. Gilbert Robertson, secretary of the Canadian Automobile Association (the A.A.A. of Canada), and also of its biggest unit, the Ontario Motor League, spoke for Col. John Moodie of Port Nelson, Ontario, who was Canada's first motorist.



Stainless Steel's Advantage Lies In Non-Corrosive Properties

High initial cost limits its use in automotive field to small exterior parts, but its ability to resist rust shows great possibilities for future development.

By ATHEL F. DENHAM

CONSIDERABLE interest has been expressed of late in the possibilities of stainless steel for bright metallic exterior parts. In general, however, very little is known about its relative value, its cost, and the production problems involved. Even for a superficial study, it is, therefore, necessary to compare it with other types of metallic exterior finishes. These may roughly be grouped into five classes:

1. Nickel plating as a final finish.
2. Chrome plating over copper, nickel, with a steel base.
3. Chrome plating over brass.
4. Nickel and chrome alloy stainless steels.
5. Stainless steel with non-metallic inclusion, comprising (a) Zirconium sulphide, (b) Molybdenum sulphide.
6. Cadmium plating.

Of these finishes, the first, nickel plating, is becoming obsolete rapidly for exterior parts on automobiles, due to its tendency to tarnish. Chrome plating on steel, with intermediate coats of copper and nickel, has proved quite satisfactory in most cases for large "flat" surfaces, such as radiator shells and bumpers. For parts having sharp corners it has not proved satisfactory as yet in most cases, due to the difficulty of plating at these points. Moreover, the cost of polishing the steel under the plate is quite considerable, and it does not prevent entirely corrosion during long periods of exposure to atmospheric conditions.

Chrome plating over brass castings, etc., has been used in some cases and has been found very satisfactory as far as corrosion-resistance is concerned, but the high cost of brass, its low strength, and the tendency of the chrome plating to peel off, are disad-

vantages which limit its use. It has been found possible, also, to plate chrome over brass in such parts as headlamp tie rods, or tubing of constant section. At the Pierce-Arrow plant this is done by pressing a split steel tube into a fairly thin brass sleeve. The expanding steel forms a firm seat and supplies the rigidity which the brass lacks, the assembly process itself being economical because a smaller amount of brass is used.

In the fourth class, nickel alloy stainless steels have been used for some time for various purposes, but have been found generally unsatisfactory where machining operations are involved. A relatively new steel of this general class is Krupp austenitic (KA2), which has the following composition:

Carbon	0.16 per cent	Nickel	7-10 per cent
Chromium	17-20 per cent	Manganese	under 0.5 per cent

Its chief advantage is that after heating to 2000 deg. Fahr. and rapid cooling, or water quenching, the steel softens rather than hardens, putting it in condition for deep drawing operations, etc. This steel, and others of this general type, have a superior corrosion resistance when compared with the usual 14 per cent chrome steels. The high percentage of nickel also gives it a more pleasing final appearance than a high

chrome steel, being softer in color. This steel may also be welded if a specially prepared rod is used.

However, like all manganese steels, it is generally difficult to machine, especially when in the form of bar stock. It is thus rather impractical to use for screw machine work. External bolts, etc., have been a source of difficulty when located in exposed parts, where corrosion mars the general appearance. Cadmium plating (6) is being used fairly

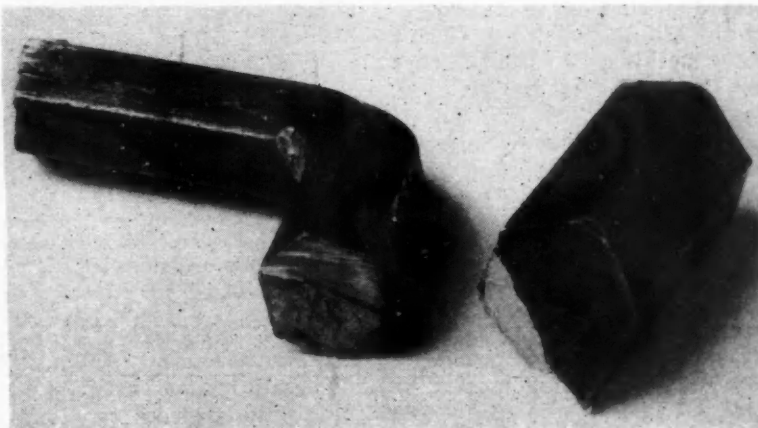


Photo of two samples of stainless steel bar stock of the same composition, subjected to the notched impact test. The sample with the large grain structure (left) indicated its brittleness by the sharp break at the notch. Note the fibrous break indicating ductility on the finer grained sample. Without the notch, however, it will be noted that the large grain sample can be bent to 90 deg. without break. For threaded parts this evidently is a point that needs close watching

widely for these parts at present, and when properly controlled while plating have given satisfactory results. On the other hand, uniformity has not been so easy of attainment, due to the difficulty of properly controlling the plating operation. Another criticism of cadmium sometimes is that it changes color when exposed to the atmosphere.

Two styles of stainless steel with non-metallic inclusions (group 5) are at present on the market, one containing zirconium-sulphide, the other molybdenum sulphide. Characteristics of both steels are nearly identical. The function of the inclusions, which are extremely fine, is to control the grain structure. They break up the grain structure and make for easier machining.

The Carpenter stainless steel with zirconium-sulphide inclusions has the following approximate composition:

Zirconium sulphide	0.40	per cent
Carbon	0.1	per cent
Manganese	0.4	per cent
Chromium	14	per cent

It is closer, therefore, to the older types of stainless steel than to the later type of high-nickel-content steels. The inclusions lower the ductility to a certain extent, but sufficient strength is maintained to make the steel usable for many parts, its physical properties being somewhat better than those of SAE No. 1112 screw stock, which steel it also approaches fairly closely as to machining characteristics. A Brinell hardness of 190-250 is readily obtainable in the cold drawn state, and as long as the bars show a fibrous fracture when broken in an impact testing machine, there is no danger of brittleness.

However, the characteristic has to be fairly closely watched while hot rolling, as the steel at high temperatures (around 1850 deg. Fahr.) shows a marked tendency towards grain growth. This, of course, must be avoided if the steel is to be used for such parts as bolts, etc., where the screw threads in effect form notches.

In finishing parts made of stainless steel, a smooth surface is essential. Small amounts of scale in the surface will act as nuclei for electrolytic corrosion. It is not advisable to finish the steel with rouge, as this will cause corrosion if not completely removed.

The use of stainless steel for bolts led to an unforeseen difficulty. Owing to the high bearing qualities of stainless steel against other metals, it is essential that lockwashers of high elasticity be provided. The most desirable type of washer, of course, would be one of stainless steel, but so far no commercial washers of this material (which would have to be polished to be free from rust) are available.

Cadmium-plated steel washers have been and are being used, and are more satisfactory than unplated steel washers. However, when they are used with stainless steel bolts, there is danger of the removal of the cadmium plate by electrolytic action, especially when chlorides are present. Non-ferrous washers, of course, would be ideal, but they do not have sufficient elasticity.

In machining bolts on screw machines, virtually the same speed can be used as for standard steel stock, but for the best finish it has been found desirable to use a finer feed. For sheet metal parts stainless steel does not appear to be very promising at present. The advantages of longer life compared to chrome plating do not appear to be sufficient at present to offset the higher material and deep drawing cost, especially when

it is considered that the average life of an automobile is probably only one-quarter to one-fifth that of a well finished stainless steel surface. However, if the cost can be brought down, its qualities may make it highly desirable.

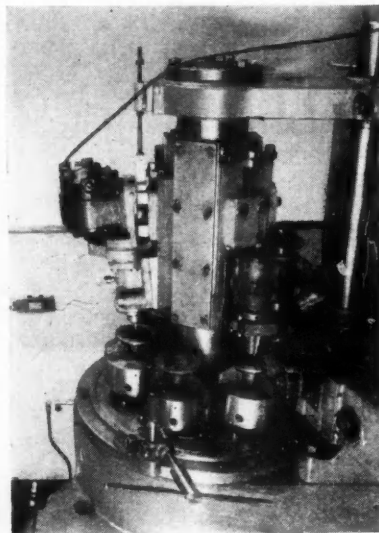
For small parts, such as bolts, nuts, and screws, stainless steel appears to possess advantages over plated finishes. It may also be used for such parts as running board moldings, etc., provided the cost is not too great a factor. For wire wheel spokes, especially on custom cars, many of which now come through with chrome-plated spokes, stainless steel also has a decided advantage in its ability to resist corrosion.

In fact, if the initial material cost can be reduced sufficiently and satisfactory methods of commercial polishing and buffing be provided, there appears to be no reason why stainless steels should not be used to a fairly large extent for parts which have an influence on the general appearance of the car. In fact, it is in use for such parts, rather than for parts of the mechanism, that the future of stainless steel in the automotive industry seems to lie mainly.

For much of the material in this article the author is indebted to the Pierce-Arrow Motor Car Co., and to John Miller, metallurgist of that company.

Bearing Retainers

IN the Baird six-spindle, horizontal chucking machine shown in the accompanying illustration, bearing retainers are being rough and finish bored, the end faced and turned, and a spiral oil groove milled in the bore at an average time of 28 sec. per piece.



A bearing retainer boring and milling operation at the Ford Motor Co. plant is pictured above

This job is being done by the Ford Motor Co. and the particular advantage of the machine being used is that different spindle speeds can be obtained to fit the work being done. Thus, in this job a high speed is employed for rough boring the hole, a somewhat slower speed is used for the finish boring operation and for facing and turning the ends, then a very slow speed is employed at the milling station

where the spiral oil groove is milled in the bore by the milling attachment shown on the top of the machine.

The unfinished part is shown in the loading position in the illustration, the long hub of the bearing retainer entering into the chuck.

WRITING on the subject of air brakes on city buses in *Der Motorwagen*, Ernst Manlik states that while decelerations of about 20 ft. per second per second can be produced by means of good brakes, in making an ordinary stop the deceleration must not exceed about 8 ft. p.s.p.s.

Cooling of Generator Depends Upon Location on Engine

Unit should be attached to powerplant in a position which permits sufficient air to circulate around it to diffuse heat produced by its operation.

PROBLEMS connected with the cooling of automobile generators are discussed in an article in *Der Motorwagen* by A. Mattes and Frederick Trautmann, engineers of the Robert Bosch Co. They point out that machine designers are quite familiar with the fact that wherever there is a transformation of energy, provision must be made for the carrying off of the waste heat due to unavoidable losses, in order to prevent injurious heat accumulation and excessive temperatures.

This problem receives special attention in the case of internal combustion engines, but the automobile designer does not always fully appreciate that there are losses

in generators of this size. For this reason, one must count with comparatively low efficiencies in motor vehicle generators; that is, with greater losses than are usual in other types of generators.

The efficiencies of generators range between 40 and 70 per cent, according to size, and since the greater losses are concentrated in smaller masses, with correspondingly smaller surface areas, the conditions affecting heat disposal are particularly unfavorable in the case of automobile generators. If these conditions are not provided for by suitable cooling facilities, the insulation of the windings may be ruined, the armature leads may become unsoldered from the commutator bar tangs, and wear of the brushes on the hot commutator may be excessive. Besides, the regulating devices and switches may no longer properly serve their functions, in consequence of which the battery also may be injured.

The Bosch firm, for this reason, and as a result of its long experience, specifies that the generator must be so located in the air current which sweeps from the radiator past the engine, that with vehicle speeds of between 12.5 and 18.5 m.p.h. an air current of at least 6.28 ft. p. s. passes over the surface of the generator, preferably on all sides, and that the temperature at the generator housing must not exceed 150 deg. Fahr.

Another obvious condition for the mounting of the generator is that it must not be heated by radiation from hot engine parts, such as the exhaust manifold, and

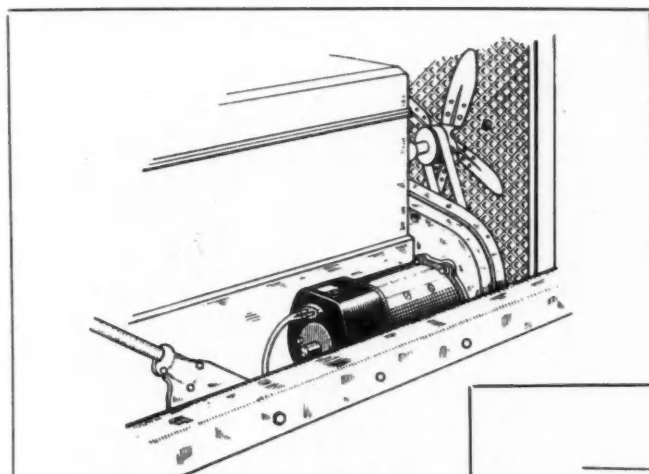


Fig. 1—Generator mounted between crankcase and frame side member behind front-end-drive housing, where it does not benefit from the air current through the radiator

also in the generator, and that provisions must be made for carrying off the resulting heat.

It is plain that the losses occurring in electric generators of such small output as those carried on automobiles are generally underestimated. It must not be overlooked that the design of such generators is restricted by unfavorable conditions of space, weight, price, speed range and overload capacity, which leads to a utilization of material that is quite abnormal in electric generators, and especially

that the air current passing over the generator has not been heated (by

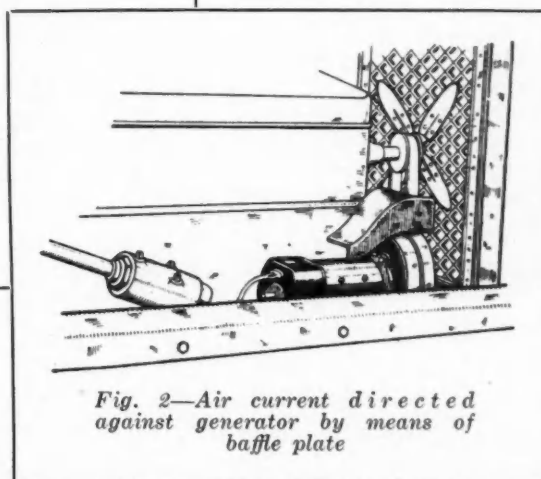


Fig. 2—Air current directed against generator by means of baffle plate

Fig. 3—Exhaust down-take pipe interferes with the air current to the generator and heats it appreciably

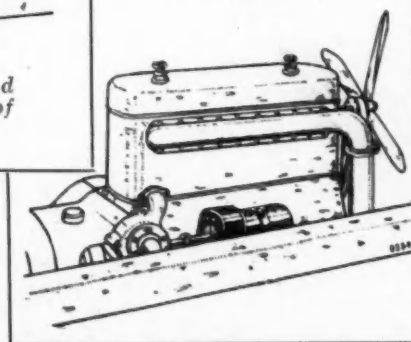
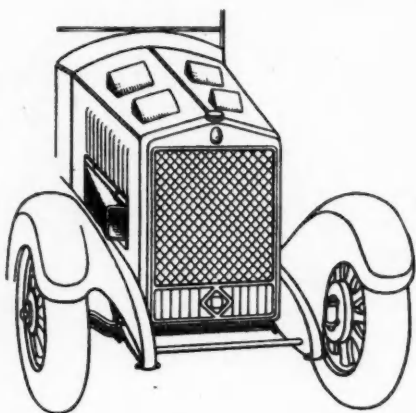


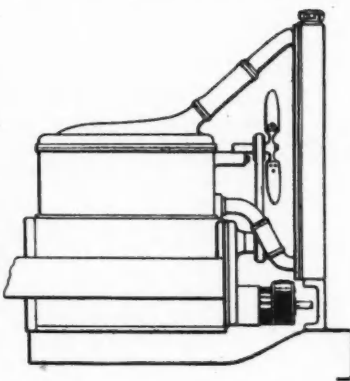
Fig. 4—Admission of cooling air to the generator is given through a scoop at the side of the hood and discharge of the heated air through large louvers in the top of the hood



passing over the exhaust pipe) to such a degree that it has a heating rather than a cooling effect on the generator.

Motor vehicle designers often attach chief importance to an inexpensive drive of the generator and to the maintenance of clean lines for the engine assembly, which induces them to hide the generator, as far as possible, between the crankcase and the frame side rail, behind some engine or chassis part, or to cram it into some recess of the crankcase, which obviously makes impossible a free flow of cooling air. An especially questionable practice is to lead the exhaust pipe (which attains temperatures of between 400 and 600 deg. Fahr.) carrying off the heat from it in another direction than toward the generator. This arrangement is met with most frequently in connection with large engines on buses and trucks. Conditions, of course, cannot be improved by providing the generator with a ventilator. Such a ventilator can pro-

Fig. 6—Generator mounted coaxial with the crankshaft. Air currents around the generator are possible only by reason of the formation of eddies as the air stream through the radiator strikes the front of the engine. The cooling effect, therefore, varies with the engine design



tect the generator against destructive effects only if the temperature of the air which it draws in does not exceed a certain value, so that with the rise in temperature occurring in the generator the maximum temperature therein will be nowhere above the maximum permissible.

A characteristic example of an unsatisfactory mounting is shown in Fig. 1. The generator is flanged to the rear side of a comparatively high front-end-drive housing and in addition crowded between the crankcase and the frame side member. It is obvious that it cannot well be reached by the air currents through the engine space, and that it must overheat when working hard.

If other weighty reasons do not permit of a different mounting, a baffle plate should be secured to the top of the front-end-drive housing, which deflects some of the

air coming through the lower part of the radiator onto the generator. If such a baffle on top of the front-end-drive housing is considered to detract too much from the appearance of the engine, the baffle may be fastened to the inside of the hood.

A very undesirable mounting is shown in Fig. 3. There would be little objection to the position of the gen-

Fig. 5—Air flow to the generator is almost completely prevented by the steering gear housing, water pump and exhaust manifold, and the generator is heated by the manifolds

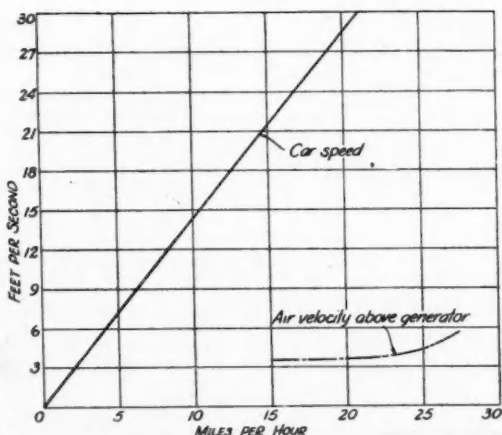
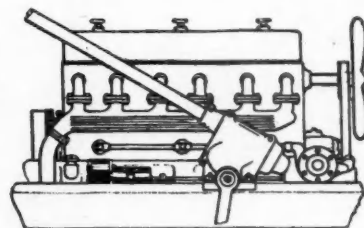


Fig. 7—Variation of air velocity above generator at car speed with an installation similar to Fig. 6. The air velocity is entirely inadequate

erator in itself, even though it is rather low, provided sufficient room were left between generator and crankcase to permit the air to pass freely between them. But the large-diameter exhaust pipe, which passes vertically through the air stream in front of the generator, and which, in addition, passes directly underneath the latter, heats the cooling air passing by it to such a degree (experience has shown) that there is absolutely no cooling effect, and that, on the contrary, the generator is appreciably heated from it. Shielding the exhaust pipe would have little if any beneficial effect, because this would reduce the area of the passage available for the stream of cooling air, and the current of air would be deflected away from the generator.

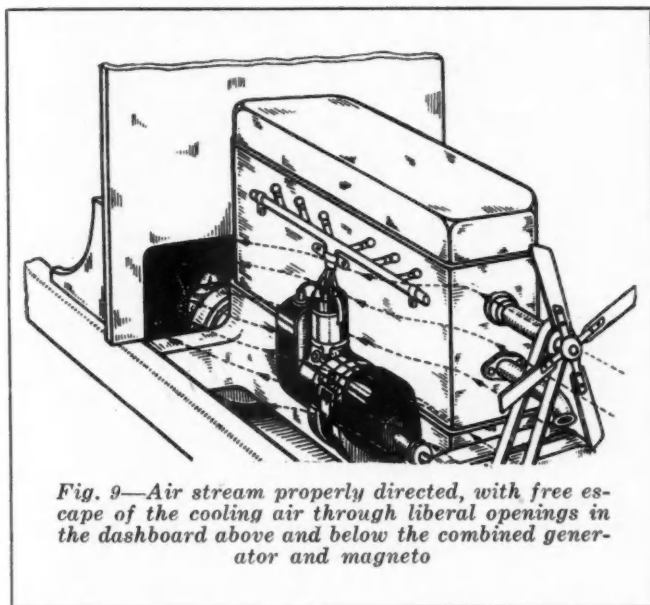
In this case the exhaust pipe should be placed outside the hood or on the other side of the engine, or it should be carried down behind the generator. Another solution of the problem consists in covering the exhaust pipe with asbestos, at the same time catching fresh air by means of a scoop secured to the outside of the hood and direct it toward the generator by means of a suitable baffle. In many cases it will be necessary, in spite of these precautions, to provide special avenues of escape for the heat given off by the exhaust manifold, so as to keep it away from the generator. To this end, large louvers may be provided in top of the hood, through

which the hot air rising from the manifold may escape (Fig. 4).

In the case of a mounting such as is shown in Fig. 5, difficulties are to be expected from two sources. In the first place, the steering gear housing, located directly in front of the generator, so reduces the area of the entrance opening that there will be hardly any air flow at the generator; in addition to this, the closed space in which the generator is located is heated by the exhaust manifold a short distance above it, particularly since, in view of the short distance between the exhaust manifold and the generator and the shielding action of the steering gear housing no air current can form.

The remedy in this case is the same as that outlined in connection with Fig. 4; that is, air should be taken in through a scoop on the side of the hood and directed against the generator; the exhaust manifold should be covered on the under side, toward the generator, and opportunity should be given the heat from the manifold to escape from the engine space through louvers in the top of the hood.

Mounting of the generator coaxial with the crankshaft, as in Fig. 6, appeals to the engine designer. Unfortunately, it does not always assure the cooling action necessary for proper functioning. In many cases the



generator is shielded by a cross member of the frame and by the front apron. Extensive tests (see Fig. 7) showed an entirely insufficient air velocity even at car speeds of over 25 m.p.h. If, in spite of this, no difficulties arise with such mountings in many cases, this is probably explained by the fact that the air entering through the radiator, especially if the latter extends down quite low, produces eddies when it strikes the front of the engines, with a resulting downward cooling effect. With a mounting of this type it is advisable to make careful temperature measurements on the first model in each case.

Installation of the generator directly behind and above the fan assures excellent cooling, but this practice is rarely followed, on account of technical difficulties.

An excellent arrangement is used on the Selve engine, the combined magneto and generator being mounted on a cradle comparatively high up on the side of the crankcase. Fig. 8 is a graph taken from a similar installa-

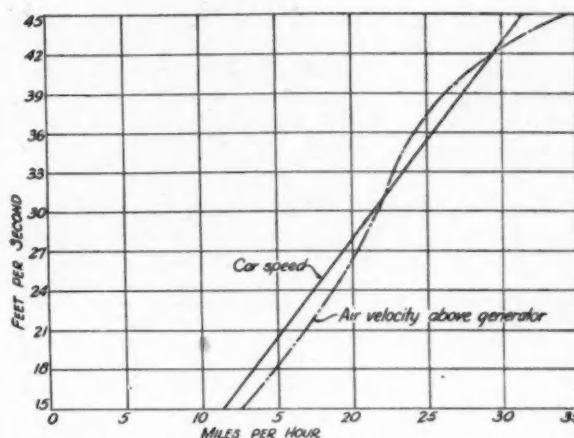


Fig. 8—Variation of air velocity over generator with an installation such as that on the Selve car

tion and shows that the specified air velocity of 6.28 ft. p.s. at 12.5 m.p.h. is greatly exceeded, and that beyond this point the air velocity increases even faster than the car speed. This is very desirable, as it is at the higher speeds of rotation that the temperature conditions of a generator usually change for the worse. Favorable comment is bestowed also on an installation on an older Benz car, in which a pump, generator and magneto are mounted in line, the generator and magneto on cradles, with steel-strap fastening. Not only is the drive fully utilized, but the generator is located directly in the free

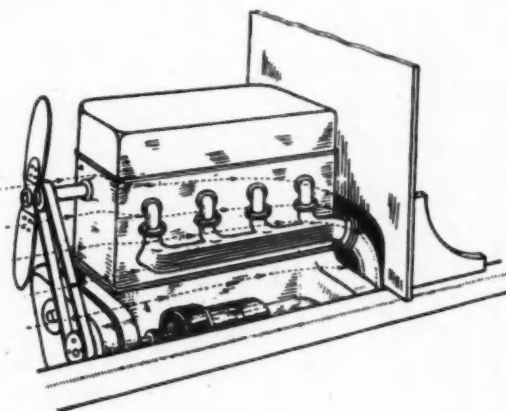


Fig. 10—Air stream unsuitably directed, with a small, partly obstructed opening in the dashboard above the generator

air current at the side of the crankcase. Although the exhaust pipe in this case is located over the generator, it is not dangerous, for aside from the fact that a large portion of it is surrounded by a muff for heating the inlet air, there is sufficient room between it and the generator to permit a strong current of air to pass between them and remove the manifold heat. Shielding of the generator by the front-end-drive housing is prevented by allowing sufficient distance between the two.

In order that the desired strong air current over the generator may be produced it is not sufficient that the generator be properly located, but care must be taken

that the air can escape freely behind the generator between the dashboard and the underpan. The outlet openings should be so located (see Fig. 9) that the air flows not only over the top of the generator, but also sweeps its sides as far toward the bottom as possible. This is evidently impossible when the outlet is throttled, as in Fig. 10, and would be impossible even if the generator itself were more favorably located than in that case.

If modern engines are considered from this point of view, it will never be difficult to find the means to meet the requirements outlined. Moreover, if the cooling problem is properly solved, it usually automatically

assures accessibility of those parts of the generator, such as the commutator and brushes, which require occasional attention. It should be pointed out also that the generator must not be so located that fuel and oil can drip on it, for it is impossible to so completely seal the generator and devices connected to it (ignition unit) as to prevent oil and fuel from entering them. These hydrocarbons, whether they are in the liquid or gaseous state, endanger the insulation and the contacts, and should, therefore, be excluded by all means. If, in addition, the engine designer provides a reliable drive, he has done everything possible to insure reliable operation with a generator of good make.

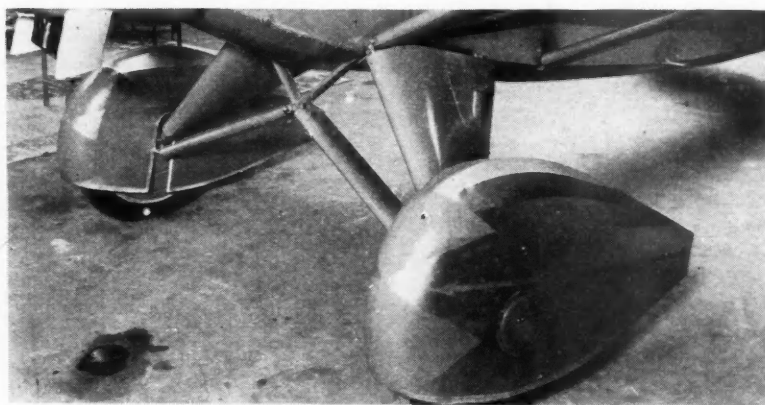
Aeronautical Exhibition at Cleveland

(Continued from page 338)

Cadillac Aircraft exhibited for the first time its amphibion. Since this plane was described in *Automotive Industries*, the hull has been changed to dural construction, and the Continental Motors engine has been adopted as standard, there being, of course, two powerplants per ship. Production is scheduled to start Nov. 1 on the "Voyageur," with a scheduled rate of 3 per week.

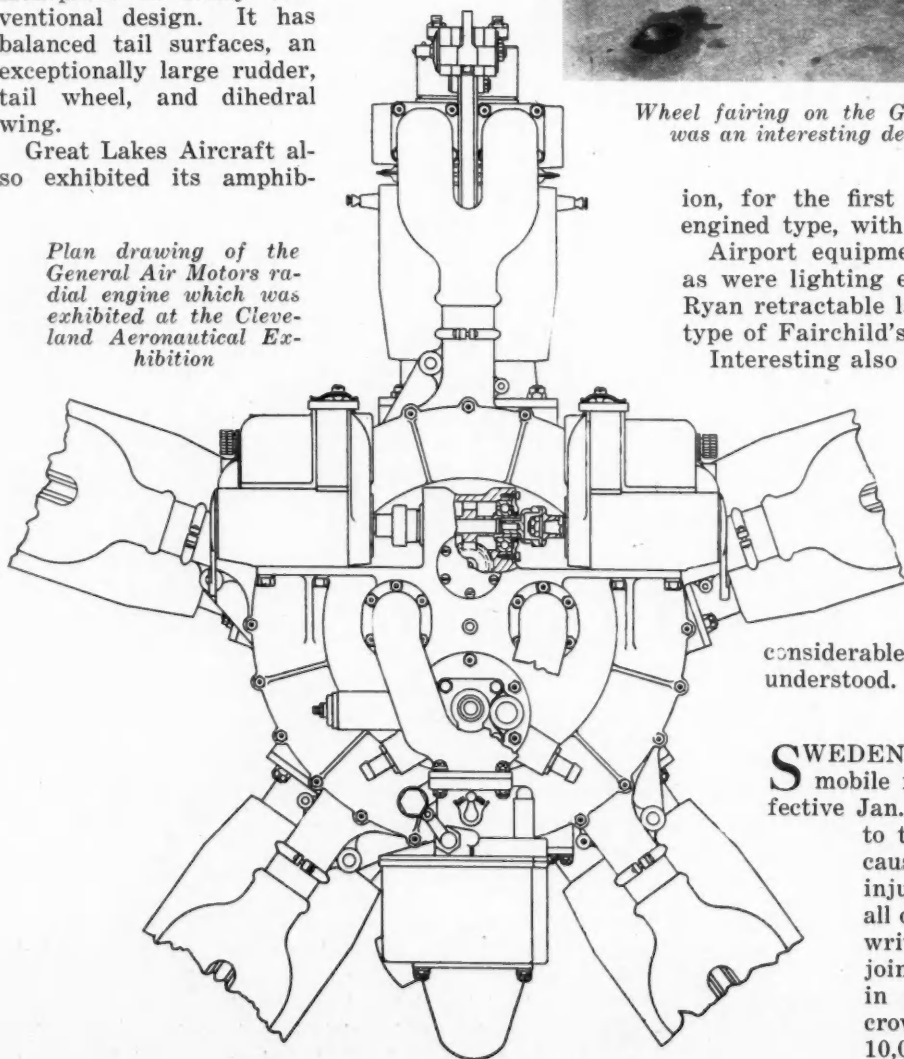
Hise Aircraft Corp., also of Detroit, exhibited a new three-Kinner-engined cabin monoplane of fairly conventional design. It has balanced tail surfaces, an exceptionally large rudder, tail wheel, and dihedral wing.

Great Lakes Aircraft also exhibited its amphib-



Wheel fairing on the Golden Eagle "Chief," shown above, was an interesting development at the Cleveland show

Plan drawing of the General Air Motors radial engine which was exhibited at the Cleveland Aeronautical Exhibition



ion, for the first time. It is of the biplane twin-engined type, with metal hull.

Airport equipment was fairly largely represented, as were lighting equipment, including the new Ilco-Ryan retractable landing lights, and the fixed built-in type of Fairchild's.

Interesting also was the exhibit of extruded shapes of its "X" alloy by Bohn Aluminum and Brass, ranging from light section and flanged tubes, bent cold at the ends after slitting, to the more usual extruded shapes. Bohnalite "X" has been previously discussed in *Automotive Industries*. It is considerably lighter than usual aluminum alloys, containing a considerable proportion of magnesium, it is understood.

SWEDEN recently adopted a compulsory automobile insurance law which will become effective Jan. 1, 1930. The law contains a clause to the effect that in case the car which caused an accident cannot be found, the injured party can obtain damages from all of the insurance companies entitled to write automobile insurance, who will be jointly liable. The maximum indemnity in cases of personal injury is 60,000 crowns, and in case of material damages, 10,000 crowns.

Tractor Manufacture Speeded By Multiple-Operation Units

Production methods in many plants based on employment of machine tools designed to carry out several processes simultaneously on a single installation.

MULTIPLE operations by single machines are being introduced to a greater extent in the manufacture of tractors as an economical measure to meet competition. The mill operations described in the following article are applicable, in a general sense, to the manufacture of almost every major part of a tractor, including frames, wheels, engines and the larger accessories.

For example, a number of drilling and reaming operations in a tractor frame are carried on simultaneously by the use of a two-way hydraulic driller built up of five 3-in. units and two 4-in. units (Fig. 1). Operations are performed on two sides of the frame at the same time, those taking place on one side including drilling two 5/16-in. holes, combination drilling and reaming one 1.378-in. hole and another combination drilling and facing of one 7/8-in. boss. In the other side of the frame

two 5/16-in. holes are drilled and one 1.378-in. hole is drilled and reamed.

The seven Natco hydraulic units used are started at once by a single air valve. All 3-in. units have one nose-adjusting sliding spindle each, while the 4-in. units are arranged with a fixed center gear-driven cluster box containing one spindle each. Production from this set-up is about 20 pieces per hr.

In another operation the maker of a tractor uses a three-way horizontal drilling unit, made up of standard Natco machines, equipped with semi-automatic hydraulic feed, to drill and ream holes simultaneously in the front, rear and top of a crankcase. In this operation the equipment, shown in Fig. 2, drills 22 and reams two holes in the front end of the transmission case, drills 13 holes and reams one in the rear end of the case, and drills 17 holes in the top. Production for this job averages about 18 cases per hr.

In another tractor plant a total of 23 operations are performed simultaneously on transmission cases by means of the equipment shown in Fig. 3. The machine is a three-way horizontal hydraulic boring machine, consisting of three standard Natco type C-6 hydraulic units and the Natco hydro uni-power system of hydraulic feed with semi-automatic control.

The right-hand head is arranged with one fixed-center gear-driven cluster box having seven heavy-duty nose-adjusting spindles. The left-hand head has five spindles and the rear head has but one spindle.

In operation, the right hand head rough, semi-finish and finish bores two different sized holes, using step cutters; core drills a third hole; drills a fourth, and drills three others of the same diameter.

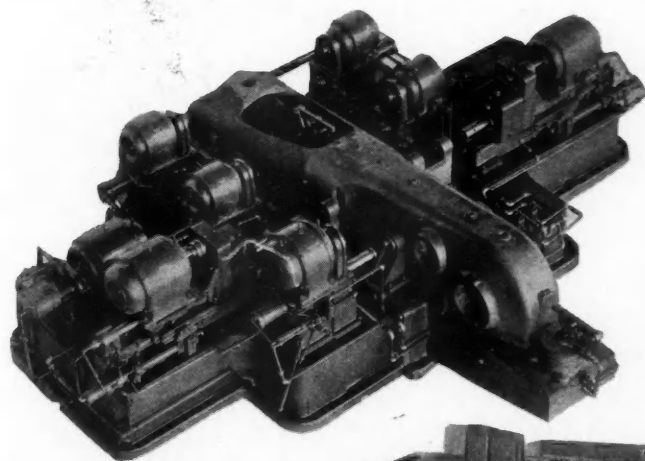


Fig. 1—Pictured above is a special two-way hydraulic driller built up of five 3-in. hydraulic units and two 4-in. hydraulic units used in drilling, reaming and facing in one operation on a tractor frame

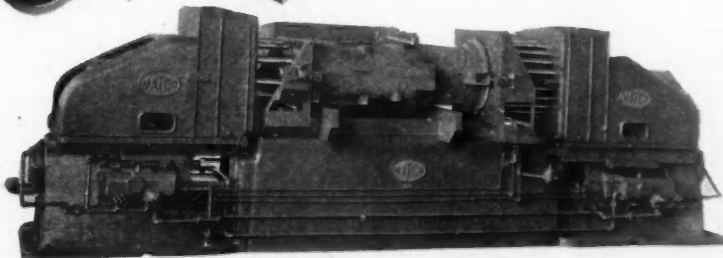
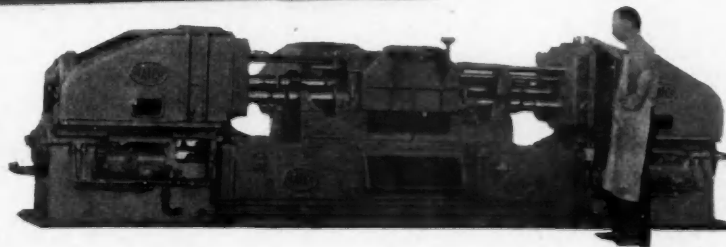


Fig. 2—The three-way driller at the left is used to drill holes simultaneously in the front, rear and top of a crankcase

Fig. 3—The horizontal boring machine to the right performs 23 operations simultaneously on the transmission case of a tractor engine



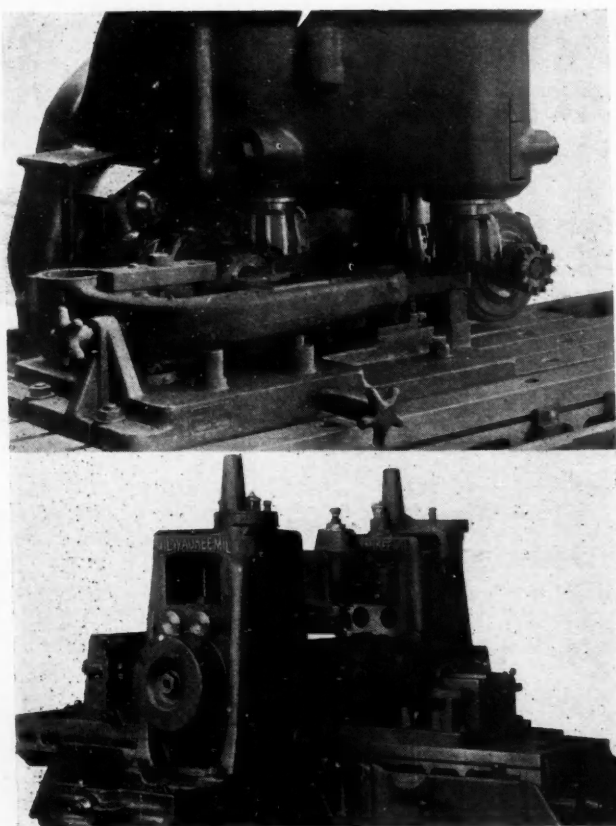


Fig. 4—(below) The equipment pictured is used for milling both ends and magneto pad of a tractor engine

Fig. 5—(above) A machine fixture in which five faces on tractor engine manifold, in five different planes, are milled at once. The method of holding the work is plainly shown

Meanwhile, the left-hand head is rough, semi-finish and finish boring two more holes of different diameters, step cutters again being used, and the machine also drills three holes of the same diameter. The rear head rough, semi-finish and finish bores still another hole at the same time.

Both ends of the crankcase of a well-known tractor engine and the magneto pad are milled in a single operation on the equipment shown in Fig. 4. The Mil-Waukee-Mil Duplex used is equipped with a 7-ft. bed and one special vertical spindle. Two hand-clamping fixtures are also used.

The face milling cutters on the horizontal spindles mill the ends of the crankcase while the vertical cutter faces the magneto pad. One fixture is loaded while the other is in the cut. The vertical spindle has $\frac{3}{8}$ -in. vertical adjustment to allow for cutter wear and is mounted on the spindle block of one head and securely tied to the overarms of the opposite head.

The manufacturer of another tractor is milling five manifold faces, no two of which are in the same plane, in a single operation at the rate of 45 pieces per hr. by means of the set-up shown in Fig. 5. A Mil-Waukee-Mil Simplex is equipped with a combination head carrying three vertical and two horizontal spindles.

A simple hand-clamping fixture holds one piece and all five surfaces are milled at one forward pass of the table. Projections on the manifold limit the set-up to one fixture, but the job formerly required five separate milling operations so that a very considerable saving has been made in machines, floor space and manpower, as well as an increase in production.

A rather unusual improvement in the production of studs for a tractor was recently made by the installation shown in Fig. 6. Two diameters and the shoulder of the stud in the machine illustrated are ground to close limits at the rate of 150 grinds per hr., compared with 20 per hr. with previous methods.

The machine is a No. 132 automatic cylindrical grinder, made by Aeter Grinding Machine Co., Worcester, Mass. The headstock has common centers, both being air-operated, and a work-positioning device is also included in the headstock. The oscillating wheel spindle is air-controlled, which permits it to feed back and intermittently grind the shoulder of the studs.

Two grinds are taken; in the first, about 0.020-in. stock is removed from the diameter, and about 0.005 in. in the second. Close concentricity is required for the diameters, with a tolerance of 0.001 in. on the dimensions. The machine indexes three times per min., resulting in a production rate of 150 grinds per hr.

With the development of larger grinding machines and heavy-duty grinding disks, large areas are now being ground successfully which could not be handled by this method a few years ago. An example is shown in Fig. 7, where end crankcase covers of a tractor are shown being ground on Gardner horizontal grinders.

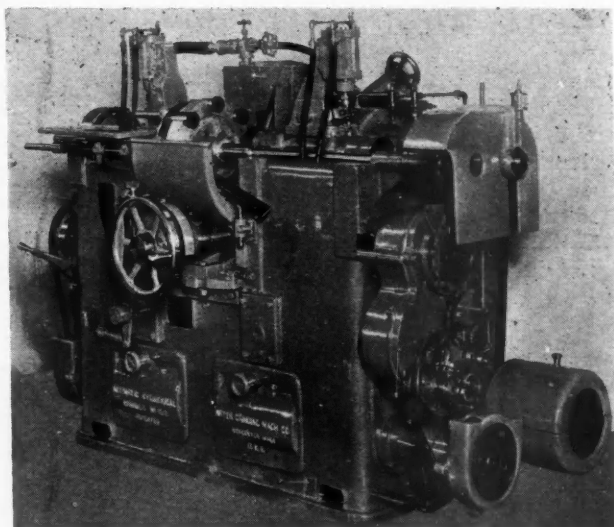


Fig. 6—Grinding two diameters and shoulder of stud is done in the machine pictured above. The installation is also tooled for valve stem guides

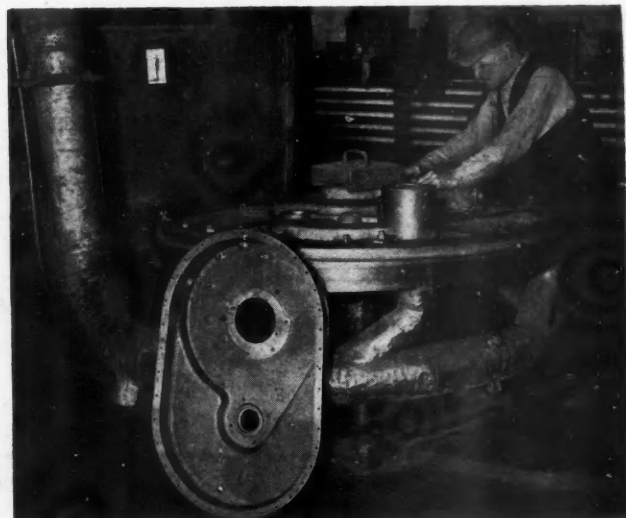


Fig. 7—End crankcase covers of a tractor are shown above being ground on horizontal grinders

Diamond T Offers Eight-Ton Truck With Timken Rear Axle Bogey

*Model 1600 is powered by a special Hercules engine, developing 98 b.hp. at the governed speed of 1800 r.p.m.
Dual pneumatic tires are used on all four wheels.*

By M. WARREN BAKER

AS a heavy duty addition to its line of six-wheel, pneumatic-tired high speed trucks, the Diamond T Motor Co. has introduced its Model 1600, conservatively rated at a capacity of 8 tons. The new job is a complement of the Model 800 recently announced with a capacity of 4 tons.

The "1600," although of great size and capacity, has a governed maximum speed of 25 m.p.h., which is increased to approximately 35 m.p.h. by the use of an optional rear axle ratio. The rear axle bogey is of Timken design and manufacture, whereas the rear axles in the Model 800 were Diamond T's own design. In the heavier type also the bogey is equipped with dual pneumatic tires on all four wheels, whereas for the lighter Model 400 single pneumatics were deemed sufficient.

The Timken SW-300 bogey which is used in the new Model 1600 makes use of worm drive in both axles, which are mounted in tandem without the use of an intermediate differential. (This bogey was described in detail in *Automotive Industries* of April 27.) Blood Brothers special universal joints, designed exclusively for this truck, allow an unusual amount of wheel and axle deflection, as will be noted in one of the accompanying photographs.

Ball joints at each end and the center of the connecting beam permit a free rocking movement of the entire assembly to compensate for road irregularities. The individual axles are of the full-floating type with rated capacities of 3 tons each,

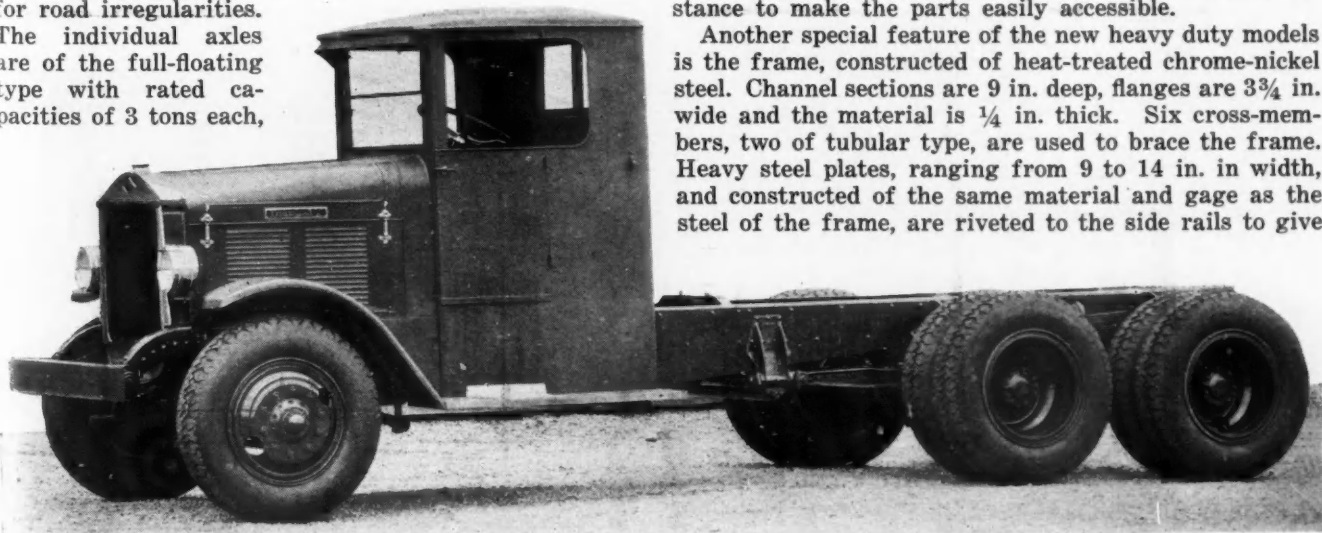
but constructed with a wide margin of overload safety. Worm and axle shafts are of heat-treated alloy steel, while the worm wheel is of chilled bronze. Timken roller bearings are provided at hubs, differentials and worm shafts. The standard gear ratio is $9 \frac{1}{3}$ to 1, while an optional ratio of $7 \frac{1}{4}$ to 1 also is available.

The engine which powers the new job is a special Hercules product with a bore and stroke of $4 \frac{5}{8} \times 4 \frac{3}{4}$ in., developing 98 b.hp. at the governed speed of 1800 r.p.m. Maximum horsepower is 106 at 2200 r.p.m. S.A.E. rating is 51.3 hp. Cylinders and the upper half of the crankcase are cast en bloc of chrome-nickel iron. The crankshaft has a diameter of 3 in. and is mounted in seven main bearings, the total projected area of which is 42 sq. in.

Crank pin bearings are $2 \frac{1}{2}$ in. in diameter and $2 \frac{3}{4}$ in. long. Pistons are of cast iron and are fitted with four rings, all above the pin. The wrist pins are made of molybdenum steel and are $1 \frac{1}{4}$ in. in diameter. Lubrication is by full pressure to all main and connecting rod bearings by gear pump. A Hall-Winslow oil filtrator is a built-in feature. A special Zenith carburetor is used.

A high velocity centrifugal pump supplies the cooling water to unusually large jackets which completely surround each valve seat. Valves are of the mushroom type, removable in sets of six. Both the idler and camshafts are adjustable from the outside for end play and special provision has been made in every possible instance to make the parts easily accessible.

Another special feature of the new heavy duty models is the frame, constructed of heat-treated chrome-nickel steel. Channel sections are 9 in. deep, flanges are $3 \frac{3}{4}$ in. wide and the material is $\frac{1}{4}$ in. thick. Six cross-members, two of tubular type, are used to brace the frame. Heavy steel plates, ranging from 9 to 14 in. in width, and constructed of the same material and gage as the steel of the frame, are riveted to the side rails to give



Model 1600, six-wheeled, high-speed truck chassis, offered by the Diamond T Motor Co. is shown above. It is powered by a special Hercules engine having an S.A.E. rating of 51.3 hp.

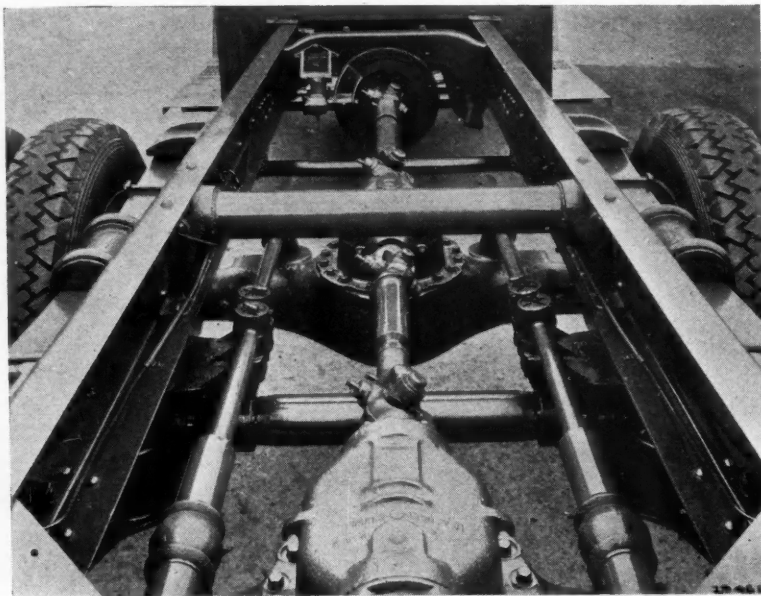
greater rigidity at points of heavy stress. The engine is mounted on the frame at the front with rubber inserts, and the spring horns are electric steel castings, nested into the frame and riveted there, so that if a great shock is taken by the front of the chassis, and the spring horns must be replaced, the operation will require no great time or effort.

Brakes are the latest design Timken hydraulic four-shoe internal duplex types, operating on all four driving wheels. A B-K vacuum booster is mounted on a trunnion behind the clutch to provide ample braking power with light pedal pressure. The hand brake is mounted behind the transmission and consists of two opposing shoes, operating against a 16-in. ventilated disk.

The clutch in the new truck is the same dry multiple disk design as used in other Diamond T series. It has nine driving and 10 driven disks and is fitted with a clutch brake to aid shifting.

Radiators are of the copper fin and crimped flat tube type, specially designed for Diamond T. They are practically burst-proof due to the ability of the flat tube to expand if the water freezes. The shell is built up of four castings and is spring mounted on the frame, thus affording protection to the core and ease of detachment for servicing. The shroud is of polished nickel.

All spring leaves are of alloy steel, separately tested. Front springs have 11 leaves, 3 in. wide and 46 in. long. Rear springs are built up of 17 leaves, 4 in. wide and 50 in. long. Both front and rear springs are semi-elliptic, but there are no shackles or pins on the rear assem-



The method of mounting the Diamond T Model 1600 chassis on the Timken SW 300 four-wheel bogey is shown in the above photograph

bly, since these springs operate only to cushion the load which is carried to the springs through steel bearing blocks of the same design as described previously when the Model 800 was introduced.

Ross cam and lever steering is used in the new model, but is provided with a special double mounting lug which insures rigidity and extra strength. The transmission is a Brown-Lipe "70," giving seven speeds forward and two reverse. The extreme low reduction is 9.5 to 1, and the over-

drive is .78 to 1. Gear faces are extra wide and accurately finished for silent operation. Main and countershafts are mounted in Timken bearings by the exclusive pivoted front support used on other Diamond T series.

Tires are 36x8 heavy duty pneumatics with rated capacity for the eight on the two rear axles of 28,800 lb. Gasoline capacity is 30 gal. and the tank is located under the seat. Budd steel disk wheels are standard equipment. Weight of the 190-in. chassis is approximately 11,700 lb. and the weight of the cab, which is special equipment, is 670 lb. additional. Body allowance is 2500 lb. Each chassis is weighed separately and the weight marked on the dash plate.

Standard wheelbases are 174½ and 190 in. Others are optional at extra cost. Width of the frame is 37 in. and the track is 75⅜ in.

Standard equipment includes heavy front fenders, grooved floor boards, speedometer, electric head and tail lights, starter, generator, battery, bumper, set of tools, jack, horn and thermostats. The base price is \$7,500.



The flexibility of the Timken SW bogey on the Diamond T eight-ton truck is illustrated in the above picture. Diamond T uses a radius rod to the bogey, it will be noted, although this is optional with the four-wheel unit

Lo-Swing Full Automatic Lathe Developed for *Piston Turning*

Seneca Falls Machine Co. offers Model U tool which requires no operator either for placing work in position or for unloading from the machine.

A COMPLETELY automatic machine suitable for cylindrical work of comparatively short length, such as automobile pistons, has been developed and placed on the market by the Seneca Falls Machine Co., Seneca Falls, N. Y. The machine is known as the "Lo-Swing Model U Full Automatic" and has been primarily developed for the turning and grooving of automobile pistons, but it can be adapted to the turning of any similar work.

The machine is completely automatic in that no operator is required either for placing the work in the operating position or for removing it from the machine. A push-button starts the machine, which will continue to perform its work without any attention until it is stopped. All that is necessary is to place the pistons to be operated upon in a chute or runway, which is done by the operator performing the next previous operation on the pistons.

Briefly, the cycle of operation is as follows: The piston to be machined is automatically picked up from the runway and placed in the operating position in the machine, where it is held between a pneumatically-operated tail center and a dowel center which fits into the open end of the piston; the latter is then driven by the bosses on the inside in the conventional way. There is one tool-holding slide on each side of the machine. The front slide or carriage, which moves in a direction parallel with the axis of the piston, holds the piston turning tools, while the rear slide carries the tools for grooving, facing and forming.

When these operations have been performed, the piston is automatically removed from the machining position and deposited on a runway on the opposite side of the machine from that where the pistons are fed into the machine. This runway carries it to the next operation, and the

piston is removed from it by the operator performing that operation in another machine.

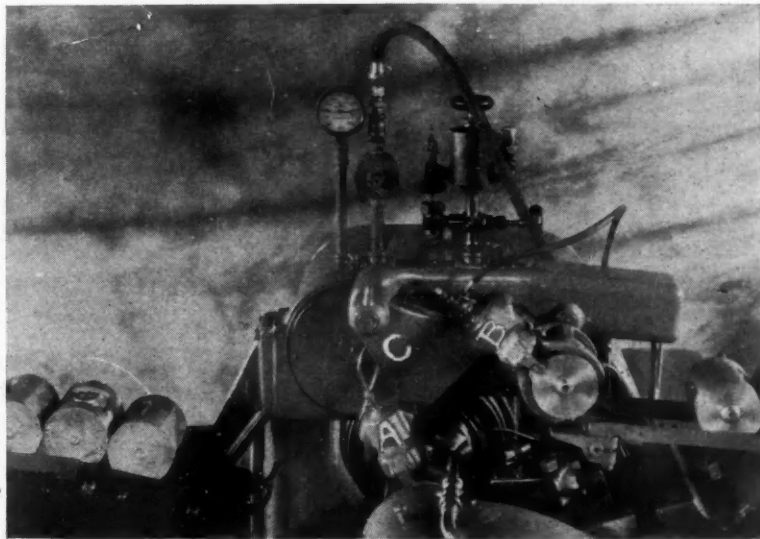
The operating mechanism that actuates the automatic movements is as follows: A motor in the base of the machine driving the main shaft either by means of a belt or chain. From this main shaft the different operating and feed motions are obtained through gearing and cams, all the tool-slides being cam operated. Pickoff gears are provided for the change of speeds and feeds. Ball and roller bearings are provided for all shafts, so that, if necessary, the high speeds required by the latest developments in cutting tool materials are obtainable.

The loading and unloading mechanism and the tail-stock center are pneumatically operated and controlled by adjustable cams operating the pneumatic valves. As may be seen from the accompanying illustration, the machine is provided with two sets of gripping fingers (A and B) designed to have much the same action as the human hand. These "hands" are also pneumatically controlled. The piston is picked up, moved over to the operating position and held there until it is located and gripped between the tail and head centers, when the "hand" is withdrawn. The same cycle is repeated for removing the piston, the two "hands" operating simultaneously, one removing a piston just as the other brings a new piston between the centers. The approxi-

mate time for removing and loading automobile pistons is $3\frac{1}{2}$ seconds.

The machine is lubricated by means of a pump operated by a cam, so that the mechanism is constantly flooded with circulating oil. The cutting compound is supplied by a centrifugal pump mounted in the base of the machine, driven directly from the main shaft.

In the first rough-turning operations on pistons made from aluminum alloys, a production of 120 per hour has been regularly obtained.



Close-up of automatic operating mechanism of the new Lo-Swing lathe described in the accompanying article. Gripping fingers indicated at A and B lift the work from and to the runways on either side of the machine. Above C is shown the rigid arm holding the automatic "hands"

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News of the Industry

PAGE 352

VOLUME 61

Philadelphia, Saturday, September 7, 1929

NUMBER 10

September May Exceed Total August Production Figures

PHILADELPHIA, Sept. 5—Factories have entered the month of September at a level of activity which promises to show a total output for the month fully equal to and probably higher than that for August. Sales officials of automobile manufacturing concerns report that the demand in the field continues very favorable.

Car production during August was reported at the first fall meeting of the National Automobile Chamber of Commerce as 516,522 as compared with 492,543 in August of a year ago, or a five per cent increase. Production for the first eight months was placed at 4,446,000 as against 3,236,364 last year, or an increase of 37 per cent.

Alvan Macauley, president of the Chamber, reported that the trade outlook was excellent, that exports are continuing to increase and that the domestic agricultural market looks particularly good.

Factories expect that the usual demand following summer vacations will be greater this year than usual, and reports from their dealers continue to show optimism for a busy fall.

During the first seven months of 1929, the total production in the United States and Canada was fixed at 3,929,545, whereas the production for last year totaled 4,601,141, leaving but 671,596 units to be produced in August to equal the 1928 record.

Manufacturers are confident that the year will close with more than 5,500,000 units produced in this country and the Dominion.

July retail passenger car sales will exceed 430,000 according to estimates based on registration returns from 39 states and the District of Columbia. This is a gain of 35 per cent over the same month last year and brings the total for the first seven months of 1929 to 2,590,000 as compared with 1,880,000 for the same period in 1928, an increase of 38 per cent.

(Detailed reports from factories on August production appear on page 353 of this issue.)

Meyer Wins A.A.A. Race

ALTOONA, PA., Sept. 2—Lou Meyer, 24-year-old ace of the speedways, today drove to his second consecutive national A.A.A. racing championship by winning the 200-mile Labor Day event here.

Car Beats Subways in Parisian Tests

PARIS (Special)—To prove that automobiles can travel faster than Paris subways, a trade magazine made tests, sending a car on an eleven-mile circuit, half through the business district and half on secondary boulevards, on a route followed by the subway.

The car averaged fourteen miles an hour, while the subway made only ten. The underground trains ran at twelve and a half miles an hour, but transfers cut down the average speed.

Chevrolet Makes Changes in Executive Personnel

DETROIT, Sept. 3—Several executive changes in Chevrolet Motor Co., effective September 1, have been announced by H. J. Klingler.

M. D. Douglas, formerly assistant general sales manager, has been appointed general parts and service manager, a position heretofore held by J. P. Little, who goes to General Motors.

R. K. White, who formerly was general sales promotion manager and recently Atlanta zone sales manager, has been appointed advertising manager, succeeding J. E. Grimm, Jr., who, after occupying the position for five has been summoned to GMC.

J. C. Chick, who has been regional sales manager at Flint, has been brought into the central offices to assume Mr. Douglas' place as assistant general sales manager.

C. L. Alexander, Chicago zone sales manager for several years, is to go to Flint, succeeding Chick as regional sales manager.

R. L. Myers, until recently zone sales manager at New York, is to succeed Alexander.

N.A.C.C. Opposes Responsibility Law

Sees No Accident Reduction And Makes States "Collectors"

NEW YORK, Sept. 4—Directors of the National Automobile Chamber of Commerce at their first fall meeting today registered opposition against the so-called financial responsibility laws recently passed in New York and other states, on the ground that these laws make the state a collector of judgments and an agent for insurance companies without lessening accidents.

The directors also recorded opposition to the New York State gas tax, because the money collected therefrom is not distinctly earmarked for highway purposes as it is in other states.

Roy D. Chapin and A. J. Brosseau, who attended European motor transportation meetings during the summer, reported that there was a worldwide interest in better highway building and other measures to encourage motor travel.

Toledo Steel Buys Fostoria

TOLEDO, Sept. 4—Majority stockholders of the Toledo Steel Products Co., have acquired control of the Fostoria Screw Co., with plant at Fostoria, and will combine the sales organizations of the two companies. The Toledo Co. makes valves for the automotive industry and Fostoria unit bushings and bolts.

Automobile Prices At Lowest Level

BERLIN, Sept. 3 (Special)—The prices of automobiles in Germany still show a retreating tendency and in June the lowest price level ever reached in Germany was attained. Compared to 1913 as a 100 per cent standard, the prices have now sunk to 61.4 per cent, i.e., one only has to pay 0.614 mark now for every 1 mark one had to pay in 1913.

Budd to Visit European Plants

NEW YORK, Sept. 3—Edward G. Budd, who had announced that he would leave here for Europe last Aug. 23, plans to sail on the S. S. Mauretania on Sept. 4. He will visit European associate companies of the Edward G. Budd Mfg. Co., Philadelphia.

American Bicheroux Buys Glass Process

Automotive Interests Loom Large in Company Just Formed

TOLEDO, Sept. 5.—Announcement of the formation of the American Bicheroux Co., incorporated in Delaware, indicates that representatives of the Libbey-Owens Glass Co., in which the Graham Bros. have a big interest; National Plate Glass Co., of Ottawa, Ill., owned by General Motors Corp.; Edward Ford Plate Glass Co., of Toledo, and the Blue Ridge Glass Corp., affiliated with the Corning interests, have formed the new corporation to acquire all rights to the Bicheroux process of rolling plate glass, handling and annealing the sheets after rolling.

Licenses have already been granted to these four companies and the Edward Ford plant here is undergoing a \$3,000,000 expansion to put to use the new process.

The National Plate Glass Co. begins within a few days to operate its first unit using the Bicheroux equipment.

The new method permits casting of a continuous sheet of plate glass by forcing the glass between a pair of large steel rollers. It enables thinner sheets to be made, suitable for shatter-proof glass.

Officers of the new corporation include Max Bicheroux, of Aachen, Germany, inventor of the process, chairman of the board; H. J. Eckenrode, president of the National Plate, president; James C. Blair, president of Libbey-Owens, vice-president; Leslie V. Christy, of General Motors, treasurer, and V. M. Dorsey, Washington, secretary and patent counsel. James McEvoy of General Motors, H. H. Baker of Libbey-Owens, and A. D. Falck of the Corning Glass Works, with the officers, form the directorate.

Rights to the new process were acquired from Maatchappy tot Beheer en Exploitatie Van Octrooien of The Hague, Holland, and from Societe Anonyme de Manufacture Des Glaces et Produits Chimiques de Saint-Gobain; Chauny and Cirey of Paris, and Charles Heuze of Auvelais, Belgium. All have been interested in the development of the process in Europe.

The Edward Ford plant here will have a capacity of 20,000,000 sq. ft.

Edward T. Jones

RIDGEWOOD, N. J., Sept. 3.—Edward T. Jones, 41, chief engineer of the Curtiss-Wright Aeronautical Corporation of Paterson, N. J., died on Friday night at his home, after an illness of three months of typhoid fever. His physician believes that he contracted the disease in May while on a vacation.

Since 1925 he has been with the Wright Aeronautical Corp. recently merged with the Curtiss Co.

Reports from the Factories for August

Among the makes of cars on which August production reports were not received as this issue of *Automotive Industries* went to press were: Cadillac, LaSalle, Studebaker, Marmon and Nash.

Ford Motor Co. broke all August production records during the month just ended, when the domestic and foreign assembly plants of the company turned out a total of 205,634 model A Ford cars and trucks. This record also is the largest for any single month in the history of the company except for October, 1925, during which the world production of model T cars and trucks slightly exceeded this figure.

Total car and truck production since the introduction of the model A Ford was 2,295,413 on Sept. 1.

For the first eight months of this year the total was 1,472,386 cars and trucks, which exceeds the high production record for the same period established in 1923, during which year over 2,000,000 model T units were built.

Dealer requirements for September will keep the daily production at the same high peak, it is announced by the company.

Chevrolet Motor Co. reports production of 109,968 cars and trucks in August. This compares with 122,702 units in August, 1928, and the company has indicated that production in September will be continued at the same high level which has been maintained during the past several weeks.

Graham-Paige Motors Corp. announces production of 6576 in August, a gain of 35 per cent over July. The August shipments of the new models exceeded 6900. Total production during the first eight months of this year was 65,926, as compared with 58,777 during the same period of 1928, an increase of 12 per cent. Export shipments in August, excluding Canada, were 668 cars. The total export shipments for the first eight months of this year were 8482, or more than double the total of 3967 for the same period last year.

Hupp Motor Car Co. reports shipments of 5255 cars in August, compared with 2496 in July.

Packard Motor Car Co. established a new August record for factory shipments with a total of 5366 cars. This compares with shipments of 5001 cars in August, last year, which was a record for August up to that time.

Buick Motor Co. has announced the production of 29,034 cars in August. This total included 25,041 Buick cars and 3993 Marquette.

According to E. T. Strong, president, production in September will exceed 1200 cars per day. Buick shipped 1582 cars on Aug. 30, the largest shipment record in its history. Previous shipment record was in 1926, when the company shipped 1554 cars in one day.

Willys-Overland shipment totaled about 17,500 cars for August, which is little less than corresponding month last year. Early

sales in September, however, indicate probably 22,500 cars will be shipped this month.

Chrysler Motor Corp. August shipments total of 47,274 cars, or an increase of over 20,000 over July, brings the grand total for the first eight months of the year to 354,390 cars, compared with 320,001 cars shipped during the same period last year. The new "66," "70," "77" and Imperial models of the original Chrysler line made the most pronounced gains. Although the factory speeded up production and was able to ship 16,803 cars, a big increase in the rate of shipment over the preceding seven months of the year, unfilled orders are piling up in greater quantities daily, according to officials.

De Soto August shipments were 8163 cars, which is 3100 above last August or an increase of 60 per cent, and 1200 more than the average built up during the first seven months of 1929.

Dodge passenger car August shipments totaled 7092 cars in the last half of the month, the Dodge plants having been closed for the first two weeks, for the one-time vacation period inaugurated in the Chrysler factory this year. Here again the rate of shipment exceeded the average for the first seven months.

The Plymouth four-cylinder line kept in step, its total for the month being 10,792 cars, which is more than maintaining the rate established by this line in the preceding seven months.

The Dodge trucks, bus and motor coach August shipments were 3694 units, and the Fargo line of commercial vehicles, 730 units, making a total shipment in the commercial car field continue the first seven months' performance.

Auburn Automobile Co. reports total shipments for August were 2161 units, of which 348 were Cord Front Drives. This compares with 1105 in August, 1928. The September production schedule calls for 2400 Auburns and 1500 Cords.

Franklin Automobile Co. shipped 1150 cars in August, against 755 in the same month last year, establishing a new record. Total shipments for the eight months were 11,201, as compared with 10,566 in the previous record year.

Hudson Motor Car Co. announces shipments of Hudson and Essex cars for the first eight months of this year as 267,341 cars compared with 230,019 cars during the same period of 1928 or an increase of 16.2 per cent. This is the best eight months period for shipments in the history of the company and leaves less than 15,000 Hudson and Essex cars to equal shipment record of 282,204 units for the entire year of 1928, which was the best previous year in the company's history. To assure a steady, seasonal reduction of car stocks in the hands of its distributing organization, Hudson is shipping at the rate of about 85 per cent of present retail sales as reported each week to the factory by distributors and dealers. On this basis August shipments amounted to 17,309 cars.

Reo Declares Dividend

DETROIT, Sept. 5.—Reo Motor Car Co. has declared its regular quarterly dividend of 20 cents, payable Oct. 1, to stock of record Sept. 10.

Chase Brass Adds Branch

WATERBURY, CONN., Sept. 4.—The Chase Brass & Copper Co. has added a branch in Minneapolis. Thirteen warehouses now serve its customers.

Men of the Industry and What They Are Doing



R. B. Little

who has been named production manager of the Auburn, Indiana, plant of the Auburn Automobile Co. He has been more than 18 years in the production end of the automobile industry and was production manager for Marmon for 12 years and was with Packard for three and a half years

Campbell is Convalescing

Colin Campbell, vice-president in charge of sales of the Willys-Overland Co., who suffered a sudden illness while en route to Detroit from Buffalo nearly two weeks ago, is reported improving satisfactorily, it was reported at the Ford Hospital here today. Physicians could not say just when Mr. Campbell, would be able to leave the hospital, however.

Johnson is Fisk Advertising Head

C. H. Johnson has been appointed advertising manager of Fisk Tire Co., Chicopee Falls, Mass. He has been connected with various New York advertising agencies, and goes to Fisk from Young & Rubicam, Inc.

Bellows Heads Arcozon Sales

Lyman H. Bellows has been appointed head of the new automotive maintenance division of the Arco Co., Cleveland paint, enamel and lacquer manufacturers. The product developed by the concern for the automotive industry is known as Arcozon.

Importer Visits Windsor

Alexander H. Finley, a sales executive of an Australian importing company, spent a few days last week at the Windsor Corp.'s plant in St. Louis.

Cadillac Names Five Men as Regional Managers

As a part of the expansion of its field organization, the Cadillac Motor Car Co., has announced the appointment of five regional managers, R. L. Newton, C. C. Clark, Bruce Adams, Floyd Akers and James A. Grier. Newton, who was formerly in charge of the development of territories and field forces for Cadillac, has been made manager of the eastern region with headquarters at New York. Grier, formerly assistant manager of distribution, has been made manager of the Great Lakes region with headquarters at Detroit. Clark and Akers, former Cadillac district managers, have been made managers of the Pacific, midwest and southern regions with headquarters at San Francisco, Kansas City and Atlanta respectively. In each of the newly created regions there are a number of zones making a total of seventeen in all.

A zone manager will have charge of each zone and will be responsible to the regional manager. At regional headquarters there will be zone service managers, accountants and special sales representatives. At present, Lynn McNaughton, vice-president; H. M. Stephens, general sales manager; William W. Lewis, director of advertising and assistant general sales manager; David R. Irwin, assistant director of advertising, and H. J. Cupper are making a tour of the country in the interest of the new sales organization.

Maise Elected by Pontchartrain

Herman C. Maise, vice-president of the Briggs Mfg. Co., has been elected chairman of house committee of the Pontchartrain club. The club is building a \$4,000,000 headquarters.

Welch Sailing for Europe

Howard S. Welch, president of the Studebaker-Pierce Arrow Export Corp., has sailed from New York for a business trip in Europe.

McWhorter to Manage Branch

G. M. McWhorter will be the new branch manager of the Brockway Motor Truck Corp.'s branch in Philadelphia, which office will be in charge of sales for eastern Pennsylvania, southern New Jersey, Delaware and the Eastern Shore counties of Maryland.

Badger Promoted by Marmon

Appointment of E. C. Badger, assistant secretary and treasurer of the Marmon Motor Car Co., to the position of special assistant to Hal L. Purdy, vice-president and general manager, has been announced. He will have charge of all major functions in the manufacture of Marmon and Roosevelt automobiles and will be the direct representative of Mr. Purdy in the Marmon factories.



J. E. McLarty

new sales promotion manager for Hudson Motor Car Co., who has served the company in various capacities since 1918

Serrano Returns From Europe

E. H. Serrano, export manager of the Windsor Corp., St. Louis, has returned after a four months' trip covering 12 Central European countries. American automobiles are in great favor in all these countries and the biggest concern with the automobile distributors is not what American car to sell, but what manufacturer will give them the most favorable terms, he said.

English Engineers Plan Visit

Harold F. Haworth, chief engineer, and Cecil Thomas Skipper, production manager and machinery planning engineer of Leyland Motors, Ltd., England, are planning to visit the United States in September. These men are coming to this country to make a study of modern equipment used in the manufacture of automobiles and trucks as preparatory steps to further modernization of the Leyland plant in Leyland, Lancashire, England.

Carpenter Resigns Treasurership

W. P. Carpenter, the oldest official in point of service with the Mullins Mfg. Corp., Salem, Ohio, has resigned as treasurer. He will remain active as vice-president and chairman of the executive committee. He joined the organization in 1881 and held a number of important executive positions in the company before becoming treasurer.

Brockway Elects Finney

Brockway Motor Truck Corp. has elected C. M. Finney as treasurer to succeed F. R. Thompson, who resigned. I. A. Stull has been appointed secretary.

Canadian Production Hits New High With 242,054 Units for Last Year

OTTAWA, Aug. 29 — Production in the automobile industry of the Dominion of Canada established a new high record in 1928 according to official figures just made public. With a production value of \$162,867,495, the industry of the Dominion broke all former records and established a new high which is far in excess of the previous one which was recorded in 1926. The output for 1927 was valued at \$128,700,514 and for 1926 at \$133,598,456. This includes the value of the cars produced, parts and accessories and also the amounts received for custom work and repairs at the factories. In 1928, parts and accessories had a value of \$12,949,249 and receipts for custom work and repairs amounted to \$741,247.

Automobile production alone also attained a new mark at 242,054 cars, with a sales value f.o.b. plant, of \$149,176,999. This figure represented an increase of 18 per cent in number and 22 per cent in value over the totals for 1926 which is the next best year. During that period 204,727 cars valued at \$115,904,228 f.o.b. plant, were manufactured.

Export shipments also showed a substantial increase during the year, advancing sharply to 79,855 cars worth \$34,400,967 from 57,852 cars valued at \$28,939,873 in the previous year. Exports of parts had a value of \$3,416,978 as against \$4,153,867 in the previous twelve months.

Imports also touched a new peak with 47,408 cars worth \$40,832,876 as compared with 36,630 cars valued at \$31,542,416 imported during the previous year. Parts imported had a value of \$48,839,955 as against \$31,852,100 in 1927.

There were eleven companies engaged in the production of automobiles during the year under review with fourteen

separate factories in operation throughout the year. Eleven of these factories were located in Ontario, two in Quebec and the other in Manitoba.

Capital invested in the industry amounted to \$97,056,328 of which \$47,970,676 represented fixed assets and \$49,085,652 representing inventory values and cash, and trading accounts. Employment was furnished to 16,749, including 2436 salaried workers and 14,313 wage-earners. In January there were 7801 wage-earners employed and then an increase was recorded until a peak of 18,885 was reached in August, the number subsequently declining gradually until 11,494 were employed in December of the year just closed. Wages for the year totaled \$24,292,217, while salaries amounted to \$5,255,897.

Production in the year under review totaled 40,680 open cars and 135,416 closed passenger cars, 17,527 trucks and 48,431 chassis. A further analysis of the output showed that 50 per cent of the total was closed, 14 per cent touring cars and 3 per cent roadsters.

An estimate of the apparent consumption of cars during the year is given as 209,607 as compared with 157,832 in the previous year. The number of cars withdrawn or scrapped during 1928 is estimated at 65,083 cars. Provided the number of unlicensed cars in the hands of dealers remained constant during the year a total of 1,227,151 cars had to be accounted for.

British India provided the best market for Canadian cars during the year with the United Kingdom second and Australia third. Exports to the former country were valued at \$6,145,813, to the United Kingdom \$5,074,950 and to Australia \$4,793,266. The United States imported cars and parts from Canada to the value of \$185,855.

chromium plating. Prices on the 152 cu. in. overhead-valve Isis, designed mainly for export, have been set at £374 for the phaeton and £385 for the sedan.

Rohrbach Forms U. S. Firm

NEW YORK, Sept. 4—As the result of negotiations which lasted for more than two months, and were personally conducted by Otto Rohrbach, head of a well-known airplane plant in Berlin, a new company has been formed in the United States under the name of the Metal Flying Boat Corp., with a capital of \$2,000,000. The company will construct exclusively the Rohrbach metal boats of the Romar type. To meet American requirements, special boats of the same type, but larger dimensions, will be built, fitted with four air-cooled motors, and able to carry 45 passengers.

Dr. Rohrbach's latest product is called the Rohrbach-Rostr, an 11-ton all-metal flying boat which carries a 5½-ton pay load.

Steel Producers See Busy Fourth Quarter

Automotive Demand is Tardy, But Outlook Good for End of Month

NEW YORK, Sept. 5—Steel company sales managers were in a rather hopeful mood following the resumption of business following the holiday. They appear to be reconciled to the thought that fourth-quarter automotive demand will be tardy getting under way, but pin their faith in the development of somewhat better consuming interest during the second half of September.

Quite a few mills have been compelled to reduce sharply their rate of operations, in some extreme cases not much more than one-half and in most strip mills not more than three-quarters of capacity being engaged.

Because of the relatively light demand from the general run of automotive consumers, much is being made of Ford buying, which, however, continues more or less routine in character. Some steel finishing mills emphasize the promptness with which they are now able to make shipments as compared with a few months ago, but there is little disposition on the part of consumers to buy beyond the immediate requirements of their own manufacturing schedules.

Prices are entirely unaffected by the slower pace of demand. Just as consumers are reluctant to anticipate their wants in order to provide steel producers with more of a backlog, they also refrain from taking advantage of the situation by bringing any pressure to bear on prices.

Leading market interests adhere closely to the policy of maintaining the present price structure of the market. Under existing conditions, keen competition among the smaller mills for any business that overhangs the markets must naturally be expected, but so far, with the demand lighter than it has been at any time this year, the market for most descriptions of finished steel is impressively steady and in some lines, such as full-finished automobile sheets, it may even be called firm.

Aluminum—The market continues unchanged and devoid of special features. A plan is afoot in Germany to place a duty on aluminum in the hope of forestalling competition by the American producer. The greater volume of aluminum production in Germany is a government monopoly.

Copper—As the result of heavy export demand and a fair volume of copper takings by home consumers, there is considerable uneasiness over the possibility of a rise in the price of the red metal. Certain it is that developments have favored producers and that the market is stronger.

Tin—New York warehouse stocks are light, the movement into consumption last month having been in excess of the trade's expectations. The market is steady.

Lead—Storage battery manufacturers have been buying consistently. The market is firm.

Morris Motors Announce New Light Automobiles

LONDON, Sept. 2—(Special Cable)—Morris Motors, Ltd., announced a production program today which includes a second new, light six automobile, smaller than the Isis, described recently. It will have a side valve engine of 2½ by 4 in. bore and stroke (122 cu. in.) and a three-speed transmission. Novel air and oil filtration systems will be used. The frame will be of "unorthodox" design. Radiator shutters will be thermostatically controlled and the car will have Lockheed brakes, a cam-type steering gear and front-shackled front springs. The wheelbase will be 114 in. and the track 56 in.

Prices on the new line are as follows: Five-passenger phaeton, £275; six-passenger light four-door fabric sedan, £285, and metal sedan with sliding roof, £299. Continued models show price increases averaging £5, but all cars now have Triplex glass and

Bohn Will Produce New Connecting Rod

Proposed Product May Equal
Piston Production,
Official Says

DETROIT, Sept. 5—The Bohn Aluminum & Brass Corp. has announced that about Dec. 1, it will begin to manufacture a new connecting rod, which in time is expected to equal in volume the Bohnalite pistons, now used in many automobiles of American and foreign makes. The connecting rod is said to be only one-third the weight of cast iron rods now being used on automobile engines.

One contract for the new product has been obtained from one of the leading producers of automobiles, it is announced. The company has just completed an addition to its plant which will be used for the manufacture of the connecting rod. This building is 110 by 150 ft., three stories in height and adds 50,000 sq. ft. to the company's floor space.

"The motor industry will have a very good last half," said Charles B. Bohn, president. "We are looking forward to a very good fourth quarter." The first six months of 1929, Bohn Aluminum & Brass earned a net profit of \$1,781,579 after charges, including Federal taxes, which was equivalent to \$5.08 a share on 350,831 no par shares of stock.

Morse Opens Pacific Branch

DETROIT, Sept. 2—The Morse Counterbore & Tool Co. will open a branch plant in Los Angeles, to be in operation the latter part of this year, according to William S. Morse, president, who has just returned from a business trip on the Pacific Coast. The new plant will take care of the company's automotive and aircraft business on the Coast and orders have been booked to keep it in operation for several months.

Women Want Comfort, Airplane Maker Says

ST. LOUIS, Sept. 4—Women are already becoming the deciding factor in the purchase of privately owned planes, officials of the Ryan Aircraft Corp. are learning. Comfort and attractiveness of design and finish are becoming the deciding factors in airplane sales. These refinements appeal to women more than men and many husbands bring the wife along when making a purchase.

Detroit Aircraft Will Build at Long Beach

DETROIT, Sept. 5—The Detroit Aircraft Corp. has announced purchase of a 30-acre tract at Long Beach, Cal., for the erection of an airplane factory. E. S. Evans, president, said that work would soon be started on the new plant, in which all the activities of the Lockheed division of Detroit Aircraft Corp. eventually will be centered. The Lockheed division is now located at Burbank, Cal., near Los Angeles.

The Long Beach site adjoins the municipal airport and is one and a half miles from the center of Long Beach and 21 miles from downtown Los Angeles.

Peerless Announces Prices

CLEVELAND, Sept. 4—The Peerless Motor Car Corp. has announced its 1930 Six-61 models, priced from \$995 and up. Prices, f.o.b., follow:

Roadster	\$995
Coupe	1,095
Victoria	1,145
Sedan, 5-pass.	1,195

Pickwick is Building Plant

LOS ANGELES, Sept. 3—The Pickwick Corp. is constructing a \$150,000 factory at El Segundo for quantity production of nitecoaches, the sleepers used by a subsidiary, Nitecoach Co.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Sept. 5—Trade and industry continue to operate at approximately the rates reported a week ago. A comparison with conditions at this time last year is distinctly favorable, industrial activity in particular being considerably higher at present than at the beginning of September, 1928. The crops continued to be adversely affected by dry weather last week, especially in the corn belt. There was a slight reduction in steel output.

CAR LOADINGS

Loading of revenue freight on American railways during the week ended Aug. 17 totaled 1,100,267 cars, which compares with 1,090,616 cars in the preceding week and 1,057,909 cars in the corresponding period last year. Loadings for the year to date number 33,045,234, as against 31,556,812 a year ago and 32,575,306 two years ago.

PETROLEUM PRODUCTION

A new peak in crude petroleum production was reached in the week ended Aug. 24, when average daily output amounted to 2,966,350 barrels, as compared with 2,941,550 barrels a week earlier and 2,477,450 barrels in the similar period last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices declined last week for the fifth consecutive time, standing at 96.9 per cent of the 1926 average, as against 97.0 a week before, 97.3 two weeks before, and 99.2 five weeks before.

BRADSTREET'S

Business failures reported to Bradstreet's for the week ended Aug. 29 numbered 263, which compares with 338 in the preceding week and 287 in the corresponding period last year.

FEDERAL RESERVE STATEMENT

The amount of Federal Reserve credit in use increased \$9,000,000 during the week ended Aug. 28, declines of \$12,000,000 in rediscounts and \$4,000,000 in holdings of Government securities being more than offset by an increase of \$25,000,000 in open market purchases. Although note circulation increased \$6,000,000 and deposits \$11,000,000, reserves also increased \$6,000,000, so that the reserve ratio declined only fractionally, from 75.5 to 75.4 per cent.

BROKERS' LOANS

During the same period, a new high record was reached by brokers' borrowings on stock and bond collateral from reporting member banks in New York City. The week's increase, amounting to \$132,000,000, carried the total to \$6,217,000,000, which compares with \$4,235,000,000 a year ago.

Financial Notes

Franklin Motor Co. reports net earnings during the first seven months of 1929 of \$1,417,930.41, which is equal to \$3.77 earned per share on the common stock after preferred dividends, taxes and other charges. This compares with \$519,031.13 or 72c a share earned during the first seven months of 1928.

Perfect Circle Co. reports net profit for six months ended June 30 of \$495,704, equivalent after all charges to \$3.05 a share. This compares with profit of \$330,887, or \$2.04 a share, for the corresponding six months of last year.

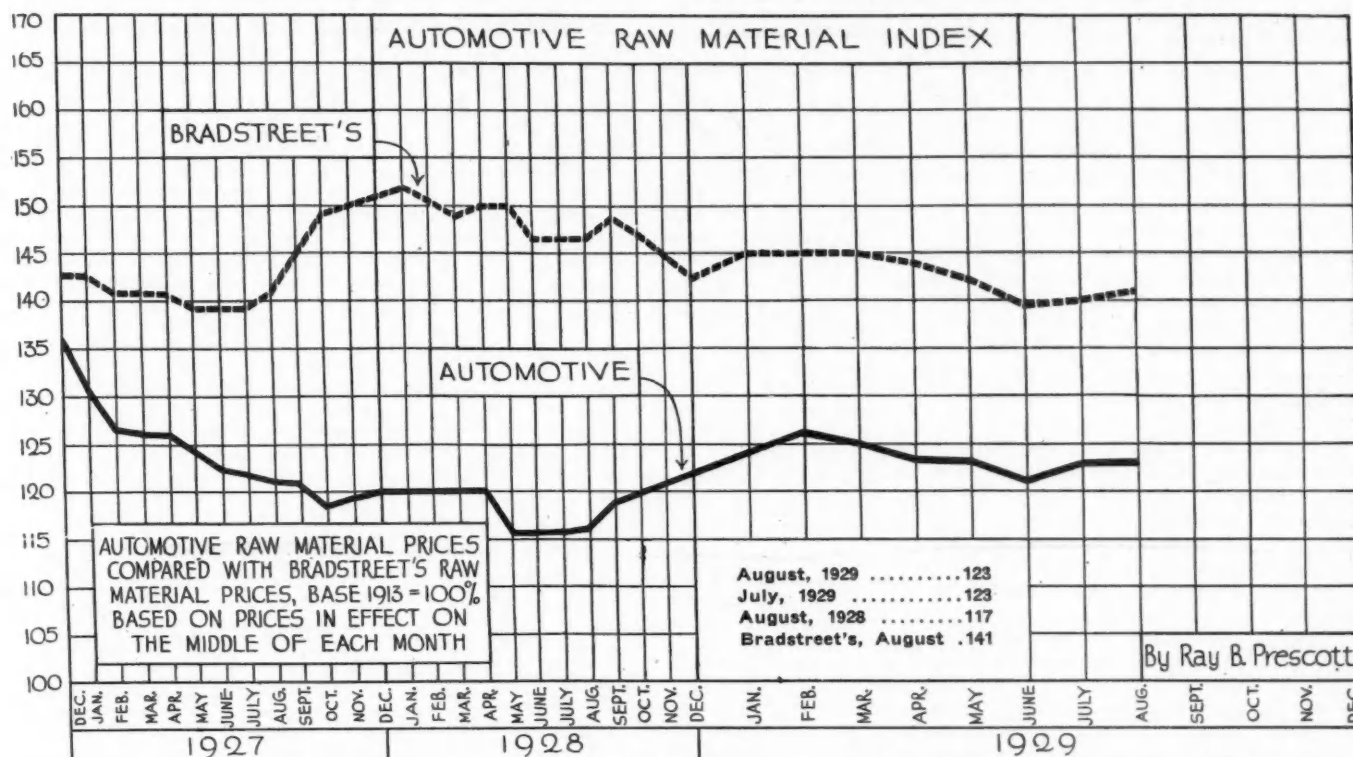
Paramount Cab Mfg. Corp. reports net earnings for the first three-quarters of the current fiscal year of \$1,215,776 before taxes. This is at the annual rate of \$6.48 a share, according to the directors.

Warner Gear Co. a division of the Borg-Warner Corp., has completed a \$1,250,000 addition to its plant in Muncie, Ind.

Goodyear Tire and Rubber Co. of Canada has declared the regular quarterly dividend of \$1.25 per share on the common stock of no par value and \$1.75 per share for the preferred, in addition to a bonus of \$5 per share on the common stock, making a total disbursement on the common for the year of \$10 per share. Last year the dividend, plus a bonus of \$1 per share, was paid on the common. Both the dividend and bonus are payable on Sept. 14 to stockholders of record as of Sept. 1.

Brockway Motor Truck Corp. has declared regular quarterly dividend of \$1.75 on preferred stock and 75 cents on common.

Raw Material Prices Remain at Level



Ford Buys Property for Jersey Assembly Plant

NEW YORK, Sept. 4—The Ford Motor Co. has taken title to the 35-acre tract in Edgewater, N. J., opposite 110th Street, New York City, which was purchased recently from the New York Edison Co.

The site is to be improved immediately with a large assembling and export plant to take the place of the Ford plant at Kearney, N. J., recently sold to the Western Electric Co.

Martin Parry Takes Lease

CHICAGO, Sept. 3—The Martin Parry Corp., manufacturer of automobile trunk bodies, has leased the south portion of the one-story building at 2848-68 Quinn Street from G. S. Blakeslee & Co., for a reported term rental of \$5,000. After alterations the premises will be used as the firm's Chicago offices and plant.

Firestone to Build in Syracuse

SYRACUSE, N. Y., Sept. 4—The Firestone Tire Co. has completed plans for the erection of a new Firestone building which will be erected at a cost of \$150,000. Work on the new building will be started immediately, it is reported.

German Industry Asks for Protection

BERLIN, Sept. 4 (*Special*)—An increasing number of voices in Germany is pleading for a revision and an increase of the import duties on automotive products. The German press is giving considerable support to the movement, but as yet no official statement on the part of the government

has been forthcoming and Dr. Scholz, general manager of the German Automobile Makers' Association, has come forward with a similar plea. In an introduction to the new year book of the association, he speaks of the great difficulties with which the German industry is faced and comes to the conclusion that the prime evil is the insufficient import duties.

Tyson Will Build Plant

CANTON, OHIO, Sept. 4—The Tyson Roller Bearing Corp., incorporated recently in Delaware for \$3,000,000, is completing plans to erect a plant in Canton and manufacture a new type of roller bearing invented by Frank Tyson, Canton mechanical engineer and chief engineer. Tyson said the new plant will employ 300 men when it starts production. An executive of the Bethlehem Steel Corp. is expected to be chairman of the board of directors, according to Tyson. Offices of the Tyson Roller Bearing Corp. are located in New York.

Superior Opens Chicago Warehouse

NEW YORK, Sept. 5—The Superior Running Board Mfg. Co. has opened a warehouse in Chicago, where Replacement Parts Factories represent the concern. F. A. Carpenter is in charge.

Chinese Imports Are Dull

WASHINGTON Aug. 29—The automotive market in Shanghai and Peking continues dull, according to reports from these cities received this week at the Department of Commerce. Passenger car sales in Tokyo are slow.

American Automobiles

Win at Belgian Salon

PHILADELPHIA, Sept. 3—Several American automobiles figured in the award of prizes made under the auspices of the Chambre Syndicale Belge de la Carrosserie et des Industries Annexes (Belgian Chamber of Commerce of Body Manufacturers and Allied Industries), at the Salon held at Ostend recently, according to the monthly Bulletin of the Chamber.

A van den Plas body mounted on a Cadillac chassis received the Grand Prize of Honor for a closed vehicle of more than four places. In the prizes awarded for excellence in certain classifications, a Packard body on a Packard chassis received the first grand prize for "vehicles of more than 12 hp.," and Essex bodies on Essex chassis took two prizes, one for a two-place vehicle, and one for the sport classification. A Graham-Paige body on a Graham-Paige chassis took a prize in the group for vehicles of more than four-passenger capacity, and Gardner units won for vehicles of four places. In the limousine class, Packard received a prize, and Packard and Cadillac chassis, with various foreign bodies mounted, figured in the award of other prizes.

U. S. Cars Continue Lead in Argentina

WASHINGTON, Sept. 4—American cars and trucks continued to dominate Argentina automotive imports during July, according to a cable from Buenos Aires this week by the Department of Commerce. During the month 7252 American cars were imported as compared with 99 of European makes.

Forecast Fall Sales Increase, Following August Pick-Up

(Continued from page 325)

wheat than last year, the report shows.

"These figures are general. The real fact is that it is the spring wheat sections in the United States and Canada that are suffering most from shortage of yield. The farmers in the United States who have winter wheat are going to get a good price for it and they will be good sales prospects. The darker side of the picture is the fact that the high buying power in the West North Central States during the past year and in the Western Canadian Provinces will be missing this year.

"It will be needless to try to force sales among the farmers in this unfortunate territory this season. Other residents in these territories will be similarly affected and dealers who live in these places must tighten their belts a bit till we get another crop out of the ground.

"On the other hand, dealers who happen to be in the winter wheat sections will be dealing with a farm buying power at least equal to last year and in some sections above last year. Prospects for corn and oats and other grain crops, both as to yield and prices, are excellent. Potato prices also will be above last year.

"The cotton farmers' situation cannot yet be accurately foretold. At present the signs of a good crop at somewhat lower prices seem to indicate, in general, a buying power about the same as last year. But this condition may turn either way before the crop comes onto the market."

The Annalist in speaking of the situation recently said: "The volume of domestic automobile sales has, up to this point, exceeded the optimistic predictions of January, and exports have also gone beyond the target; under such circumstances as these the forecaster has to choose between general principles of over-and-under supply—which have failed so far this year—and the more prosaic doctrine of 'wait and see.'"

Following are the sales reports prepared especially for *Automotive Industries*:

New York

August sales of new cars in the metropolitan territory have not reflected tendencies of the earlier part of the year. New-car registrations in this territory are just about on a level with those of the corresponding period a year ago, whereas the earlier months have shown higher sales throughout. Dealers are at a loss to account for this, excepting that new-car buyers may have made their purchases earlier this year than usual. There have been no unusual conditions present in the market to retard sales.

New-car registrations for the first two weeks of the month were 7300 cars, as compared with 7183 for the corresponding two weeks of 1928, according to Sherlock & Arnold.

Boston

Motor car sales in Boston for August were better than dealers had anticipated. Price reductions stimulated sales among cars where cuts were made, without resulting in any retarding effect upon other lines. Dealers feel that the exceptionally fine weather had much to do with this.

Used cars were moving very well, and stocks were not piling up beyond reasonable numbers.

Ford dealers have been able to catch up with orders, and now it is possible to get cars on the day they are ordered. Dealers expect September sales to continue reasonably well.

Chicago

New-car sales in the Chicago territory during August were very slightly below those in July, but showed about 10 per cent increase over August of last year.

New-car stocks are not heavy, as even those makers who have new models ready for presentation have given dealers ample time to dispose of present styles.

Used-car stocks are showing some tendency to pile up once more and are estimated as being in excess of 15 per cent greater than July. Cars in the lower-price brackets continue to provide about 70 per cent of the total volume.

Detroit

While the final sales figures for August will not be available for several days, sales are running about the same for this month as for July and slightly better than July of last year.

Half-year privileges on automobile licenses in Michigan, whereby owners pay a half year's fee on and after Sept. 1, are expected to increase sales during September.

Ford is selling approximately 40 per cent of all the automobiles sold in Detroit. Chevrolet is next in line, and Buick has been doing exceptionally well, ranking third thus far this month.

Used cars continue to be a big problem for dealers. Every effort is being exerted to move them. Prospects are good for a good September season.

St. Louis

Sales of new cars during August were 15 per cent better than in July. Used-car sales were poor as compared with the same period last year, and used-car stocks are heavy.

Ford enjoyed good sales and is showing a steady monthly increase, while Chevrolets are falling behind. High-priced models are enjoying normal sales.

Accessories sales are 8 per cent better than August, 1928.

Cincinnati

August new-car sales were 2 per cent under July, and used cars 10 per cent, but new and used-car sales were slightly over 1 per cent above August last year.

New-car stocks on Sept. 1 will be approximately 20 per cent under those of Aug. 1, and a steady demand for used cars has cut inventories about 5 per cent under July. In comparison with 1928, new and used-car stocks are about 48 and 22 per cent lower, due to dealers cleaning up for new models.

Low-priced cars accounted for 78.6 per cent of sales, medium, 19, and higher-priced, 2 per cent. Ford led the field at a ratio of 175 per cent over Chevrolet and

496 per cent over Essex. Variable weather hurt business generally, but the upturn in used-car sales was a big feature.

Milwaukee

Prospects for an active September business in passenger cars are generally considered favorable by Milwaukee distributors and dealers, with general business conditions continuing along very satisfactory lines and not having experienced nearly the usual summer letdown.

New-car registrations have shown a gain each month this year over last, although the progress of Ford business accounts for the bulk of the gain. Total new-car registrations in Wisconsin from Jan. 1 to Aug. 1 numbered 74,999, compared with 57,096 in the same period of 1928, a gain of 17,903. In the same period Ford sales increased from 4074 to 22,395, a gain of 18,321, while Chevrolet dropped from 15,637 to 14,579, a loss of 1058.

With 13,950 registrations in July, this was the biggest July Wisconsin has ever experienced, the best previous July being in 1926, when registrations numbered 13,871. The increase over July, 1928, was 2518, while Ford bettered its 1928 July sales by 3339. While low-priced and high-priced cars are moving better than a year ago, the medium-priced class has been having a hard time holding its own.

Atlanta

Low-priced car sales gained in August over July and were better than last year. Ford sales were unusually good, but Chevrolet was less active. Medium-priced cars sold slightly better than last year, and high-priced cars showed about the same volume.

Used-car stocks on all-priced cars were very heavy. New stocks have been declining somewhat, however.

All dealers are optimistic over prospects for fall trade.

Kansas City

New-car stocks in hands of dealers here are normal for the season, showing about 5 per cent decrease over last August. Sales in the low-price field predominate, but cars in the high-price class have been selling slightly better than a year ago. Sales in the medium-price field have been spotty.

Hot, dry weather that has materially cut the crop prospects has slowed down sales. Ford sales lead the field, with Chevrolet second. Whippets have the edge for third place. Ford units will about equal their two nearest competitors.

Used-car sales have been good, with most dealers reporting fewer on hand than a year ago. They are not keeping pace with new-car sales, however.

Dallas

Automotive business holding up well, with outlook for September bright. August new-car sales 2 per cent above July and 6 per cent higher than same month last year. Stocks 3 per cent lower than preceding month. Low-priced cars constitute 60 per cent of business, medium-priced, 30; high-priced, 10.

Fords and Chevrolet still in dead heat, with latter gaining some in rural districts.

Used-car stocks about same as for preceding month, though sales slightly higher. Dealers reconditioning near-year models and guaranteeing service. Prices have been

Berlin Exchange Admits Ford Motor of Germany to Board to Value of \$1,428,540

BERLIN, Sept. 3 (*Special*)—The shares of the Ford Motor Co. of Germany have now been admitted to the Berlin Stock Exchange to the extent of 6,000,000 marks or \$1,428,540 nominal value. The total share capital amounts to 15,000,000 marks or \$3,570,000.

As the status of each company applying for its shares to be admitted to the exchange of the German capital is carefully investigated by a special committee, the Ford company was forced to disclose some particulars that it was hitherto difficult or impossible to obtain.

It was learned that the company employs 351 workers and an office staff of 66 and that its production of cars and trucks amounts to about 17,500 annually. Tractors are being built at the rate of about 4000 a year. In 1927 the Ford company had a turnover of nearly

24,000,000 marks, or \$5,714,000, which in 1928 dropped to 23,000,000 marks.

Business in the current year is said to be satisfactory. As dividends have not been paid hitherto by the company, there was a special difficulty in getting its shares admitted because the Berlin exchange has made a principle of only admitting such companies as for some years past have worked with good profits.

The Ford Motor Co., however, could convincingly prove having worked with a profit which had been reinvested in its own plants. As the obligatory legal reserve fund has in the period from 1925 to 1928 collected \$119,000 and as a further voluntary reserve fund with double that amount could be shown, the admittance board of the Berlin Exchange made an exception.

Air Travelers Organize Association in Chicago

CHICAGO, Sept. 5—The National Air Travelers Association, recently organized here, plans to serve as a clearing house for all aviation information and is collecting detailed reports covering the physical conditions surrounding airports, methods of operation for all transport companies, tariff rates and schedules, and will also devote much time and effort in collecting meteorological information affecting weather conditions throughout the entire United States.

Members of this organization will be able to obtain through the central office information of technical value from governmental and other reliable sources.

Bellanca Test is Success

NEW CASTLE, DEL., Sept. 3—The new giant tandem, Wasp engined Bellanca airplane, built by the Bellanca Aircraft Corp., for the Chicago Daily News, was given its first test with complete success here recently. It took off after a short run and its landing speed proved to be about 45 miles an hour. The plane weighed about 7000 lb. Cruising speed of the airplane is about 120 m.p.h. and top speed is given as 140 m.p.h.

Fuller & Sons Move Offices

MILWAUKEE, Sept. 5—Executive, sales and engineering offices of the Fuller & Sons Mfg. Co. have been moved to the Bankers Building, here.

Ross Will Announce New Steering Gear

Improvement in Cam and Lever Said to Increase Efficiency

LAFAYETTE, IND., Sept. 5—An improvement in the Ross cam and lever steering gear, claimed to be the greatest advance since the introduction of the cam-and-lever type several years ago, is soon to be announced by the Ross Gear & Tool Co.

Efficiency ratings from 64 to 79 per cent, with still further increase probable in the maximum figure, is said by Ross engineers to have been developed in this improved product, to be known as the Ross "roller mounted" cam and lever steering gear. This compares, it is understood, with 52 to 54 per cent efficiency in steering gears developed up to this time, and provides an actual increase of 23 to 40 per cent in ease of steering as compared with the most efficient competitive gear.

A remarkable reduction in friction between the cam and the lever of the gear is said to have been accomplished by mounting on Timken tapered bearings the lever stud through which steering effort is transmitted from the cam to the lever. The stud formerly maintained a sliding contact with the cam. It is said no departure has been made from the original cam and lever principle and that the gear retains the greater leverage, lower internal pressures, "road sense" and control of road shock for which the Ross Cam and Lever Gear has been known.

The Ross Gear & Tool Co. has just completed its greatest six-month period, and has increased production schedules.

Forecast Indicates Fall Sales Will Increase, Following Pick-Up During August

(Continued from page 358)

reduced. Stocks expected to be heavier with better new-car buying in September and October.

Denver

Car market conditions have improved greatly in the last thirty days. Small cars report the best August in five years, and an increase of about 30 per cent over July. Medium and heavy cars are somewhat behind, but much improved.

Ford dealers report used-car stocks in much better condition; all others report about the same as July; i. e., much too heavy. Fords furnished 53 per cent of all car sales this month; Chevrolets about 28 per cent that of Fords.

Cleveland

Dealers report new-car sales for August running approximately on the same level with the high mark set in July. Comparison of figures for the first three weeks of August shows deliveries exceeding those for the full month of August last year.

A slight decline in the used-car market is noted, but all indications point to a heavy

total when figures for the full month are compiled.

Ford continues to hold the lead in the new-car field, though the margin has been appreciably lessened by Chevrolet.

Minneapolis

Automobile dealers are getting all set for the best season in their history. Weather conditions are good. Crop conditions are spotted in some of the states, which has an effect, naturally, on sales. North Dakota and Minnesota are affected to some extent. Montana is good and South Dakota is fair to better. While August was somewhat of a clean-up time, business was reported good.

Stocks of new cars are not in excess of requirements, and the used-car situation has improved in the last two weeks.

Ford cars still have the lead, with Chevrolet next in line. Higher-priced models are selling well, such as Stutz, Pierce-Arrow and Plymouth.

Oakland

Northern California sales for August were slightly under July but showed a

10 per cent increase over August, 1928. Stocks of new and used cars are about keeping pace with sales and trade-ins. Sales of low, medium and high-priced cars, respectively, are approximately 60, 31 and 9 per cent of total.

Ford and Chevrolet sales combined are about half of the total with Ford sales two and one-half times those of Chevrolet. Buick sales in August, with new model, are nearly twice as large as those of July. Ford sales are about four times those of second competitor, Buick.

With new models coming, dealers are expecting big business in September.

New Orleans

New-car sales increased 10 per cent over July, with Chevrolets ahead 14 per cent, Fords 11 per cent, and all others 7 per cent of the total sales for August.

In used-car sales Ford gained 35 per cent, Chevrolet, 22 per cent, and all others, 43 per cent. Demand for used cars is still good, and stocks are low.

The strike still influences the market of new-car sales, but the prospect for September is good.

Pan-American Highway Congress Ends Sessions

WASHINGTON, Sept. 5—The Second Pan-American Congress of Highways which last week concluded its sessions at Rio de Janeiro, in its final resolution approved the principle of the gasoline tax for road improvement funds, but opposed the diversion of income so raised to uses other than highway improvement, according to a cable received here this week.

The Congress asserted its belief that all national road programs should be under centralized government control. Looking forward to the day when motorists can drive from Canada to Tierra del Fuego, the Congress, during its sessions, fixed many important highway policies affecting the entire western hemisphere. The American delegation, headed by J. Walter Drake, expects to visit Montevideo before sailing for the United States. The next meeting of the Congress will be held in Chile.

Begin Pan-American Highway

WASHINGTON, Sept. 5—Mexico and El Salvador have already located and begun construction of their sections of the proposed Pan-American Highway, according to reports submitted at the Second Pan-American Congress on Highways at Rio de Janeiro last week. Guatemala and Nicaragua have asked the Pan-American Confederation for Highway Education to join with them in a survey of the route and Honduras has taken preliminary steps for a coastal highway which will serve as a unit in the inter-American system, it was reported.

Prepares Bibliography for Engineers

NEW YORK, Sept. 4—The American Society of Mechanical Engineers has prepared a bibliography of books

Will Chart Weather for Atlantic Fliers

WASHINGTON, Sept. 3—Weather officials of the United States, Great Britain, Germany and France will assemble soon in Copenhagen to complete arrangements for an international weather information exchange. This will end the uncertainty that has always been encountered by trans-Atlantic fliers.

Congress has appropriated \$30,000 for the work, and the United States will receive weather reports twice a day from Europe, which will be based on radiograms sent from ocean liners. Edgar B. Calvert, chief U. S. weather forecaster, is en route to Denmark to attend the conference.

on Japan for the use of visitors to the World Engineering Congress to take place in Tokio in November. It comprises eleven pages and is divided into four divisions, according to the interests of the four branches of engineering.

Announces Drop Forging Session

CLEVELAND, Sept. 5—The fall meeting of the American Drop Forging Institute will be held at Buckwood Inn, Shawnee-on-Delaware, on September 25, 26 and 27, according to A. C. Johnson, secretary of the Rockford Drop Forge Co. and president of the Institute. The meeting will be addressed by Charles F. Abbott, executive director of the Institute of Steel Construction, on "Rationalization of Production," and by Dr. Zay Jeffries, director of research of the United States Aluminum Co., on "Looking Toward the Future." There will be papers on forging problems.

Brewer-Titchener Will Build Forging Additions

CORTLAND, N. Y., Sept. 4—The Brewer-Titchener Corp. has just closed a contract with the Austin Co., of Cleveland, for a substantial addition to its Cortland Forging division at Cortland. The job will consist of a steel frame forge shop 70 x 120 ft., with a 26 ft. clear space under the truss; an addition to the die and tool shop 80 x 80 ft., and an extension to the present crane runway and steel storage 32 x 70 ft.

This unit will be equipped with the latest type of friction board drop hammers, ranging in capacity from 3000 to 5000 lb., and with necessary upsetters, presses and fuel oil forges. When fully equipped, the present forging capacity will be increased about 30 per cent. The forge shop has been operating two shifts to capacity the past year.

Licensed Airplanes Double

WASHINGTON, Sept. 5—The number of licensed and identified aircraft in the United States increased 100 per cent during the last fiscal year, according to an announcement this week by the aeronautics branch of the Department of Commerce. There were 7287 licensed and identified planes in operation in this country on June 30, 1929, as compared with 3156 on June 30, 1928, or a gain of 4131 planes, according to the report.

Reliance Plans Addition

MASSILLON, OHIO, Aug. 31—The Reliance Mfg. Co. will construct a substantial addition to its factory facilities in order to take care of its increased sales of lock washers and to provide additional floor space for a new but closely allied line which will allow the company to enter new fields.

Calendar of Coming Events

SHOWS

Vienna FairSept. 1-8
International Aircraft Exhibit, Coliseum, ChicagoSept. 7-15
National Machine Tool Builders' Exposition and Congress, Cleveland, Sept. 30-Oct. 4
Paris, AutomobilesOct. 3-13
London, AutomobilesOct. 17-26
Prague, AutomobilesOct. 23-30
Paris, MotorcyclesOct. 23-Nov. 3
M.&E.A. Show and Convention, ChicagoNov. 4-9
N.S.P.A. Show and Convention, DetroitNov. 11-16
Berlin Auto SalonNov. 14
London, TrucksNov. 7-16
Paris, TrucksNov. 14-24
London, MotorcyclesNov. 30-Dec. 7
Brussels Auto SalonDec. 7
New York NationalJan. 4-11
Newark (N. J.) Automobile ShowJan. 11-18
Boston Automobile ShowJan. 13-25
Chicago National, ColiseumJan. 25-Feb. 1
Cleveland Automobile ShowJan. 25-Feb. 1

CONVENTIONS

American Welding Society, Fall Meeting and Exposition, ClevelandSept. 9-12
American Institute of Mining and Metallurgical Engineers, Cleveland, Sept. 9-12
American Society for Steel Treating, Convention and Exposition, ClevelandSept. 9-13

American Chemical Society, Fall Meeting, MinneapolisSept. 9-13
A.S.M.E.—Iron and Steel Division—National Meeting, ClevelandSept. 9-13
West Virginia Motor Transportation Association, CharlestonSept. 11
Society for Electrical Development, New York CitySept. 13
Eastern States Exposition, Springfield, Mass.Sept. 15-21
American Drop Forging Institute, Shawnee-on-DelawareSept. 25-27
American Electric Railway Association, Atlantic CitySept. 28-Oct. 4
National Industrial Advertisers Assn., CincinnatiSept. 30-Oct. 2
National Safety Congress, Annual, ChicagoSept. 30-Oct. 4
Penna. Automotive Association, Erie, Pa.Oct. 7-8
Permanent International Association of Road Congresses, Sixth Session, Washington, D. C.Oct. 7-11
Associated Business Papers, Chicago, Oct. 21-22
Society of Industrial Engineers, DetroitOct. 16-18
National Hardware Association, Atlantic CityOct. 21-24
Society of Industrial Engineers, Sixteenth Annual Meeting, Hotel Statler, ClevelandOct. 23-25
Amer. Gear Mfrs. Asso., Phila.Oct. 24-26
World Engineering Congress, Tokio, JapanOct. 29-Nov. 22
National Automotive Parts Association, DetroitNov. 6-8

Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13
National Automobile Dealers Association, New York CityJan. 6
American Roadbuilders Association, Atlantic CityJan. 11-18
National Automotive Dealers Association, ChicagoJan. 27-28
Southwest Road Show and School, WichitaFeb. 25-28

RACES

Schneider Trophy (Aeronautical), Calshot, EnglandSept. 7
SyracuseSept. 8
ToledoSept. 15
Los AngelesNov. 17

S. A. E.

Production Meeting, ClevelandOct. 2-4
Transportation Meeting, TorontoNov. 12-15
Annual Meeting, DetroitJan. 21-24

SALONS

Hotel Drake, ChicagoNov. 9-16
Hotel Commodore, New York CityDec. 1-7
Hotel Biltmore, Los AngelesFeb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1